REPORT OF A TOUR

IN THE

CUDDAPAH AND NORTH ARCOT DISTRICTS

MADE IN AUGUST 1879,

BY

CHARLES BENSON, M.R.A.C.,
ACTING SUPERINTENDENT OF GOVERNMENT FARMS.

MADRAS:
PRINTED BY E. KEYS, AT THE GOVERNMENT PRESS.

1879.

A TOUR IN THE CUDDAPAH AND NORTH ARCOT DISTRICTS.

From C. BENSON, Esq., M.R.A.C., Acting Superintendent of Government Farms, to C. A. GALTON, Esq., Acting Secretary to the Board of Revenue, dated Saidapet, 20th September 1879, No. 1,092.

Introductory.

I HAVE the honor to submit the following report of the tour in the Cuddapah and North Arcot Districts, performed under the instructions conveyed in the Board's Proceedings, No. 1,953, dated the 7th July 1879, from which I have recently returned.

Description of route followed.

2. I left my head-quarters here on Saturday, August 2nd, reaching Cuddapah at the same night. During the next three days I devoted my time to investigating the systems of cultivation carried on in the neighbourhood of the town, after which I marched north to Khazipett on the Kurnool road, where I saw some of the cultivation under the Irrigation Company's Canal. From thence I returned across the Pennar to Kamalapuram, and from that place proceeded on the 11th by rail and road to Jammalamadugu, one of the cotton-growing localities of the district; but whilst there I was not able to see much of the neighbourhood, being, for three of the days I was there, laid up with fever. After leaving Jammalamadugu I returned by a different route to Muddanúr, proceeding *viâ* Gundikota and Kondipuram. From Muddanúr I returned to Cuddapah on the evening of August 16th, and left again for Ráyachóti, which I reached on the morning of the 18th, and thence proceeded to Madhanapalle, halting at Guramkondah *en route*, reaching that place on the 23rd. After seeing the neighbourhood I left on the 27th for Palmanair, where I remained two days, and then marched down to Gudiyatam, whence I returned to Saidapet on September 1st as already reported. On the 28th August at Palmanair I received G.O., No. 1,728, dated the 19th August 1879, directing that my tour should be postponed.

3. I travelled during my tour the following distances :—

	By Rail.	By Road.
To and from the district	257	12
Movements of camp	69	190
Visits villages (about)	...	40
Total ...	326	242

In all the distance travelled, excluding visits to villages, the distances of which I am unable to give accurately, was 528 miles. The district is in many parts a hilly one, abounding in ghats, and a most expensive one to travel over, and the similarity of many large contiguous tracts obliged me to make some very long marches. The effects of the climate on the establishment I had with me have been serious, for none of them have escaped bad attacks of fever, whilst out of the eighteen office days since his return my clerk has only been able to attend on eight owing to the state of his health.

4. Owing to the short time at my disposal it was not possible for me to see nearly the whole of the district, and for that reason I am unable to submit a full report treating of the agriculture and agricultural conditions of it as a whole, and I shall confine myself to a few observations on the different localities which I visited, and the farming pursued in them separately.

5. *Cuddapah Taluk.*—In the neighbourhood of the town of this name the cultivators prosecute a system which is most commendable; in fact, the farming thereabouts is by far the best with which I have become acquainted in this country. The soil generally prevalent is a fine free loam, which, with water and manure, may be brought to any pitch of condition, besides possessing great natural fertility. The adjacent town affords large supplies of manure, which are largely made use of and are carted out for considerable distances around it, some being carried, I was informed, as far as Chennur on the banks of the Pennár, 8 miles from Cuddapah. The large number of wells, together with the tanks which exist, furnish a good supply of water, which in the case of the wells does not require to be lifted very high, the water-level being usually near the surface. Thus, with a favorable soil and advantageous conditions as regards the supply of water and manure, it would be a mark of the greatest possible want of appreciation on the part of the Cuddapah ryots if they were not able to flourish in their highly-favored valley.

High class of farming pursued near the town.

Advantages of soil and position.

6. Besides, however, the favored nature of the situation, other causes must have been at work to cause the Cuddapah ryot to be a so much better farmer than the ryots of other parts of the same district. One cause can, I think, be found in the extremely high rates of rent which the land in the neighbourhood often bore until a recent date. Having to pay a rent varying as high as Rs. 35 per acre in some cases, it was only possible for the ryot to make both ends meet by high cultivation, and this has been adopted in many instances; whilst finding that by pursuing a good system on land for which he had to pay a heavy rent the produce of it was very much increased, and yet gave him a good return for his expenses, the ryot has been led to apply the good points of his system to all the lands he holds. By this means, what at first appears to have been a heavy rent has probably been in some degree the cause of the improvement of the local agriculture. A very similar result has also, I believe, occurred around Tinnevelly in the valley of the Tamrapurni under a similar influence of high rents.

High rent the prime cause of the good farming.

7. Whilst making this suggestion, as an explanation of the facts observed, I must of course defer to greater local experience, which might show the causes to have been other than that named, but it points to a conclusion that much land in this country could bear a heavier rent to the improvement of its agriculture. High rents and good farming are usually found to exist together as long as the rent is not excessive or more than the land can actually bear.

8. The extreme localisation around Cuddapah of the better class of farming is remarkable, and shows how little such practices have any tendency to diffusion throughout the country, unless some pressure is felt by the ryots. A slight difference of soil apparently bars the way to the adaptation elsewhere of any of the practices pursued even in the immediate neighbourhood, and which have been conclusively proved to be remunerative. A difference of soil of course necessitates a change of the details of practice, but the broad outlines and principles remain the same.

Practices localised and not adapted to varying conditions.

9. It has been suggested that the reduction of the rent will lead to a deterioration of the agricultural practice, but as there has in a great degree been rather an equalization than a reduction, this is not greatly to be feared. Besides, the self-interest of the ryot stimulates his endeavors to cultivate his land in the method he has found profitable under adverse circumstances. Certainly lazy ryots, if they find that they can get a sufficiency for their wants without the exertion they have been accustomed to, may gradually become careless and wasteful, and so their practice may deteriorate. The force of custom, however, which is the greatest obstacle to progress in this country, is likely in this case to be an agent for good as preventing any retrograde movement.

Deterioration of farming practice not to be feared.

Irrigated lands.

Paddy cultivation.

10. On the irrigated lands, of which there is a considerable area, the chief crops are paddy and indigo, grown in a sort of rotation, thus: indigo is not grown more than once in three years on the same land, paddy and other crops filling up the intervening period. In the case of paddy the system of cultivation is very similar to that pursued in other parts of the Presidency. The seed is almost always sown broadcast in the "puddle." Leaf manure is extensively used, 5 to 10 cart-loads, or about 1 or 2 tons per acre being a common application. Water is as usual kept on the fields continuously during the growth of the crop, and thus much more is used than is necessary. After reaping the crop, it is kept in the sheaf for a short time, and then threshed out in the usual way by cattle. Indigo refuse (from the vats) is also extensively used for this crop, none of it being lost; this is very good practice, and makes the crop (indigo) a valuable restorative one, and thus enhances the value of it over and above the direct profits obtained from the production of the dye.

Cultivation of indigo.

11. In the case of indigo on the irrigated lands the crop is not grown more than once in three or four years; it is sown after harvesting the cold weather paddy crop; the amount of seed used varies from about 20 to 40 lb. per acre, according to the quality of the soil, the richer soils of course requiring less seed. The seed is always broadcasted, which, with a crop of this nature, is a mistake, although perhaps in a measure unavoidable from the state to which the land is reduced during its preparation, which renders it too sticky for the free passage of a drill. The crop is only weeded once during its growth, and the state of many of the fields I walked through was extremely foul, the crop being nearly ready for cutting. Only one cutting is obtained on this land, which, although very bulky, does not yield well as regards the outturn of dye, and consequently sells at a much lower rate than the more slowly grown crop of the unirrigated lands. This is what might be expected from the rapidity with which the plant grows under irrigation, and the consequent watery nature of the produce. After reaping the crop, the stubbles are allowed to sprout afresh, and are then ploughed in, thus affording a green manure to the land. This crop is therefore turned to nearly full account, although in some of the details of its cultivation there is room for considerable improvement. The only thing that appears to be wasted is the water used in steeping the plant; this water is valuable as a manure, containing a considerable quantity of the soluble substances, salts of potash, &c., found in the leaf.

Crop made good use of.

Indigo on unirrigated lands.

12. Indigo is also largely grown on the unirrigated lands, but there is nothing very remarkable in the treatment of the crop. It is alternated with the ordinary cereal crops, and thus forms part of a rotation. It receives a small amount of manure, and is cut several times during the year. Occasionally it is kept down for two years on the same land. The land under the crop at the time of my visit was full of grass and generally dirty.

Crops grown under wells.

13. Scattered throughout the irrigated and unirrigated fields are very numerous wells; these afford the ryots of the locality a means of keeping their lands constantly under crop, which, with the supplies of manure they obtain from the neighbouring town, is possible for them to do. Amongst the crops growing whilst I was at Cuddapah there was a large area of korra (*Panicum Italicum*), a four months' crop, which only requires occasional irrigation. It is sown broadcast. Cholum (*Sorghum vulgare*) is also grown to a considerable extent, and during its growth receives a species of interculture by driving the native plough across the rows of the crop, after which the earth is heaped up around the roots of the plants. Cumboo (*Pencillaria spicata*) and raggi (*Eleusine corocana*) are also grown on the same lands as the crops already referred to; they are either garden lands, or irrigated lands which have a constant supply of water from some source—canal, tank, or well,

Turmeric (*Curcuma longa*) is also grown to a considerable extent in patches on lands of the nature last referred to. This crop demands good treatment, but when cultivated properly is, to the ryot, a profitable one. It requires the expenditure of a large amount of manual labor, which of course the ryot himself can provide, and brings in a large return.

Green fodder.

14. The practice of cutting cholum green for fodder for cattle is not unknown in this locality, although it is not extensively practised as far as I could discover, being chiefly adopted when there appears to be no likelihood of the crop producing a good crop of grain.

15. The abundance of fuel in the neighbourhood also prevents the use of bratties extensively for fuel, so that the soil receives a good deal of what is removed from it by the crops raised.

Irrigated land on the black clay.

16. North of the Pennar in the neighbourhood of Khazipett, where I halted, I visited some of the land which is under the Irrigation Company's Canal, where the soil is a black clay, naturally of high fertility, capable of withstanding severe droughts, and only needing thorough and deep cultivation to render it almost indifferent to the ordinary failures of rain from which we periodically suffer. I visited this locality at the particular request of the Collector, as the Canal Officers frequently complain of the ryots not taking the water they bring.

Ryots quite right in refusing to take water.

Unsuitability of soil for irrigation.

People not rice-eaters.

Cattle unfit for work in paddyfields.

17. That the ryots do not take the water is, I consider, a mark of their intelligence and knowledge of the nature of the soil they have to deal with. A stiff clay soil, of considerable depth, provided with drainage to carry off the surplus water neither naturally nor artificially, is, it is scarcely needful to remark, not suited for irrigational purposes, except under the most careful management, and in cases of the failure of rain. For paddy cultivation the soil is not at all adapted. When also it is remembered that the ryot of this part of the country is accustomed to live upon grains grown by the aid of falling rain only, and that to him a crop of paddy is so much produce that he must sell, and after sale purchase his means of subsistence from the proceeds, it is natural that he should abstain from converting his ancestral lands into a pestiferous paddy swamp. Again, the cattle, which are common in the locality, are not well adapted for the cultivation of paddy according to the native system; they are by far too large and clumsy for use in the small beds, in which alone the ryot finds it convenient to raise his paddy crop; and, as the ryots observe, they require a breed of small, wiry, light bullocks for work of the sort; such a breed does not exist in the locality.

Expense of preparing fields.

Results of deluging a clay soil.

18. Again, such ryots as have attempted the cultivation of paddy on such soil as I refer to—what is usually called "black cotton soil"—have learnt by experience the ill-advised nature of their attempts. In the first place the expenses of reducing the land to the perfect level which is essential for native paddy cultivation are heavy, probably about Rs. 20 at least per acre, and when the crop is sown and reaped it may, and usually does for the first year, raise delusive hopes of large profits in the future. Such hopes are raised only to be destroyed. In the second year it is found that the crop does not thrive so well, and that more work is required. By the time the third year comes round the effects of deluging an almost impervious clay with water are well marked; and the wretched ryot, who now has to pay an enhanced water-rate, finds that his lands are becoming what is locally called "Psoudu," *i.e.*, saturated with the soluble salts drawn up from below, or left by the water used in irrigation.

19. If ever the canal is to be a success in tracts where this clay soil exists to any large extent under the conditions I have noticed—

(1) The habits of the people must be changed.
(2) A new breed of cattle must be introduced.
(3) The existent soil must be changed in its character, or otherwise treated, to render it fit for irrigation.

20. If the ryots be induced to take the water offered them by any means, the results to be expected at present are on this clay soil—

(1) The growth of a crop, which will be exported, and so the markets for the usual food-grains of the people will have to be supplied from elsewhere, and consequently at a higher price.
(2) A deterioration in the farming practised.
(3) The probability of, after a few years, large areas of land being thrown up as utterly ruined by the presence of an excess of soluble salts, and that this land will be permanently injured.
(4) The increase of ill-health in the population from their living amongst undrained paddy swamps.

Popular idea of source of deleterious salts.

21. Regarding the fact, universally testified to, that two or three years of paddy growing on the clay soil suffice to render it "Psoudu," I was informed by the ryots that it was due to the fact that the water supplied was taken from the Kundair river, and this idea was supported apparently by a statement that in the first year that water came it was brought from the Tungabhadra. From my inquiries, however, I do not think the idea can be supported. As far as I could discover, on lands irrigated directly from the Kundair, where the soil was favorable for irrigation as being more of a loamy or sandy nature, no complaints of the presence of a superabundance of these deleterious salts are known, and these lands have often been under cultivation for many years. This, I think, although the time at my disposal did not allow of my visiting the Kundair myself and making local inquiries, may be safely taken to dispose of the attributed evil character of the Kundair water, especially when considered in conjunction with the natural consequences of flooding a clay soil unprovided with adequate drainage.

Untenability of idea.

22. My explanation of the statement that the Tungabhadra river water was harmless the first year is that in the first year the evils of flooding the land do not make themselves felt.

Excess of salts due to want of drainage.

23. Regarding the actual cause of the annually increasing amount of deleterious salts, it is not necessary for me to explain fully, what is a well-known fact in scientific agriculture, that on undrained land the soluble salts in the soil are continually being drawn to the surface. That the soil in the locality under reference is destitute of proper drainage in almost every way must be admitted. It has neither a porous subsoil, nor in some places even adequate surface drainage, and thus the land has but little chance of getting rid of the surplus water. It being an axiom in irrigation that "the water must be passed through the soil and not simply over it," this fact shows the unadvisability of endeavoring to force water on the ryots. The ryots themselves assured me that the surface water did not find its way off the land well, and, from what I saw in the part I visited, I believe this to be quite correct. As for passing the water through the soil no arrangements have been attempted. Unless land of this nature is well drained it can never be under continual irrigation without suffering. In the Cauvery valley, in Trichinopoly, a soil of a very similar nature is to be found, which produces continuous crops of paddy, and is constantly under irrigation without in general suffering. This is due to the thorough subsoil drainage which exists there, by which the danger of the injurious salts rising up to the surface is, as I pointed out in my report on that district, except in peculiar cases, prevented. The subsoil there is sand and the clay not very deep.

Black clay soil in particular requires good drainage.

24. I have stated the probability of the health of the population being injured by the extension of paddy cultivation. On the general facts of such consequences being natural, it is not necessary for me to speak here, as in a paper published in the Annual Report for this department for the year 1877-78 I explained it fully; but I may notice that experienced officials informed me that near Chennur, where the canal water is largely used, although the soil is a loamy clay, and drainage not altogether absent, the health of the people has been decidedly worse since the canal water came than it was before. Colonel Mullins has, I know, asserted that fever has not been increased in this locality since the canal was opened, but I believe that this statement is open to great doubt, seeing that the reasoning on which the assertion was based was, to say the least, most peculiar. Besides causing swamps all round their villages the spread of paddy cultivation decreases the area of waste and open land around the houses, and consequently increases the amount of nuisance near them, as well as herding the cattle on a smaller area during the night. This can but have an injurious effect on the salubrity of a place.

Effect of extended irrigation on the health of the people.

25. Before, however, concluding my reference to this work, I may mention that near Khazipett I saw a large area of free light loamy soil, admirably adapted for irrigation, and which I believe could be irrigated from the canal if a feeder were taken off from it; in fact, I was informed that this was the case. Such land as this under irrigation would produce far more food-grain than it now does, and the danger of its being injured by flooding is very small. The objection that the people of the locality are not rice-eaters of course prevails, but the difference in the amount of yield, consequent on the use of irrigation water, would more than compensate for their having to sell their produce and purchase other grain in its place. By careful consideration of the nature of the soil only can irrigation works become profitable undertakings, and to the want of such consideration must the want of success in this canal be attributed. Did I hold land on the black clay, I should prefer to be without supplies of irrigation water to having my land drenched and ruined by it. The ryots would be better advised on such soils, unless the drainage is perfect, to pay for being allowed to abstain from using the water than for using it.

Neglect to take water to a suitable soil.

The influence of the nature of the soil on the success of our irrigation works.

26. There is nothing in the ordinary systems of farming in the neighbourhood now referred to to be worthy of note.

27. *Jammalamadugu Taluk.*—The greater portion of this taluk is one wide-spread open plain of black clay soil—"cotton soil"—very bare of trees, only supporting a scanty growth of *Acacias* here and there, which are allowed to grow for the supply of firewood. Such trees are not planted, nor are the seeds ever sown, it being considered necessary that the goats should distribute them. The soil is very often deep, and is underlain to a large extent by limestones and slates of the Cuddapah formation.

Description of locality.

28. North and east of the Pennar, on the black clay, the staple crops are cholum and cotton, although indigo is grown to a certain extent also. Close to the villages occasionally small patches of chillies and other vegetables are also raised, but the supply of these products in the locality is very meagre. By far the largest area is occupied by cholum, which is commonly taken for two or three years in succession, and then followed by cotton. Indigo is usually sown together with korra (*Panicum Italicum*), the latter crop being cut out before the former attains any size, and thus a double crop is obtained from the land.

Crops usually grown.

29. Unfortunately whilst at Jammulamadugu I was, owing to an attack of fever, unable to see much of the neighbourhood, but in visiting a typical village I saw what, I believe, from what information I gathered, I should have only seen repeated had I been able to visit several.

No means of irrigation.

30. Means of irrigation there are none, or very few, north of the river; tanks are not required, and in fact the country is so level as not to present any facilities for making them; whilst the clay soil is so retentive of moisture that but little rain suffices to carry a crop to maturity, whilst less still would be enough if the system of tillage were less perfunctory and careless. It was from this taluk that the soils, experimented with by Mr. Schiffmayer in 1876,* were sent, and, by the results obtained by him, their powers of absorbing and retaining moisture were most clearly shown. From these results it will be seen that the percentage of organic matter in the soils is not high, ranging according to the experiments from 2·99—6·03, or, say, on an average 4 per cent. as mentioned in paragraph 28 of my Trichinopoly Tour Report, and that therefore the retentive power alluded to is due in a great measure to their mineral composition and physical texture. Irrigation is not desirable on such soil as this; it is in fact injurious.

Retentive powers of soil great.

General system of tillage.

31. The perfunctory nature of the tillage performed may be understood when it is described. In preparing the land for cholum or cotton, it is first ribbed by means of the country plough, the intervals between the furrows being about six inches. In doing this work one pair of cattle are said to be able to get over about an acre in a day. After lying for some time in this state, the whole surface soil is stirred, by means of an implement called a *Guntakah*, to a depth of not more than two inches. By this operation all the weeds and grass are cut off below the surface, and consequently die before the seed is sown.

Description of the *Guntakah*.

32. The *Guntakah* is an implement which performs to a great extent the work of a grubber or scarifier in English farming, and is well adapted for certain purposes, and if not too much depended on. It may very well be used, as it is, in preparing a seed-bed, but the work it performs does not suffice for good farming, whilst in this locality it is supposed to do so; it goes no depth, and never moves more than a small quantity of the surface soil. It consists of a beam about 4 feet long, to which the draught pole is attached as in the native drill, and to this beam, in such a position that it will be forced under the soil when the implement is drawn over the land, and about 6 inches from it, a cross piece of iron is fixed parallel to it. This piece of iron is a square bar hammered out so as to form a knife-edge, which in passing through the soil, being worn on both sides, does not get thoroughly blunted. The bar is about 3 feet long and is turned up at the ends so as to enable it to be fixed in the wooden holders, which are let into the beam already mentioned. The implement is in fact a large scraper, or may be compared to a huge Dutch or push-hoe with the handle (draught pole) fixed at an angle of 45° to the hoe instead of 160° or thereabouts.

Results of perfunctory cultivation.

33. It can thus be easily understood that the tillage usually performed is very little. A ploughing, which does not stir one-sixth of the surface soil to a depth of more than 2 or 3 inches, followed by a couple of scrapings of the surface, is all the preparation the ryot of this neighbourhood usually makes for sowing his crops. In seasons of abundant rain this suffices, and the natural fertility of the land gives him crops which his labor has done but little to encourage. In seasons when the rain fails, the crops fail, and he finds himself face to face with starvation; whereas in seasons of all but total absence of rain, he should be able to raise fair crops on the soil he cultivates did he treat it well.

Ryots' object in ploughing deeply.

34. Although the usual system of tillage is poor, the ryots are aware of the value of deep cultivation, as is shown by the use of a large plough yoked to several pairs of cattle; but the chief value of the work done by this implement is set on the effect it has in the destruction of Hariali grass (*Cynodon dactylon*). The effects of the use of this implement are said to be observable for ten years, but the

---

* See page 19 *et seq.* of the Saidapet Farm Report for 1875-76.

area annually operated on is very small; and the use of this description of implement is not at all universal. The crop usually taken immediately after the deep tillage is Bengal gram (*Cicer arietinum*). Did this practice prevail over the greater part of the black soil area, and were it regularly performed, there would be little danger of the locality suffering from a failure of crops, which, when it occurs, is most severely felt here, owing to the absence of roads for the transport of food-grain into the district.

System of growing Cholum.

35. The cholum crop, which is the staple of this locality, is in a few cases manured, but only on the lands close to the villages, and as the available supplies of manure are small, owing to the use of cowdung for fuel, it is but a small area which gets any even of the sun-dried poor stuff which comprises almost the sole manure supply of the ryots. The seed is sown with the drill and the work is done in a most workmanlike manner. The weak point of the country drill—there being no control over the seed supply—is fully admitted by the ryots, but they say that, as the owner always feeds the machine himself, the requisite amount of care—which must be very great—is always bestowed on this matter, and the sowing is done evenly. If left to hired labor, as the ryots say, the results would be disastrous, for even if all the seed was put into the ground, which is doubtful, it would be sown so irregularly that the crop would be patchy and poor. During the growth of the crop it is weeded, and the soil is heaped up around the plants.

Growth of and produce from Cotton crop.

36. In cotton culture, the preparation of the soil is not marked by any peculiar practices. The sowing is done in August and September, and about six months afterwards the first picking is obtained. Usually about eight pickings are made, and the total yield of uncleaned cotton is said to be about eight maunds, yielding about two maunds (50 lbs.) at the outside of lint. According to the cotton statistics, the official average outturn for the year 1878 was 41 lbs. per acre. The lint is separated by a simple roller gin, which, though slow working, is sufficiently effective, seeing that during the cotton harvest season there is little or no work going on in the fields and the labor is found in the ryot's own family. The picking of the cotton is paid for, when hired labor is employed, by a share of the produce. The shallow nature of the cultivation adopted for this crop must always be a bar to the introduction of finer varieties of the plant, which have been accustomed to better treatment, and in the same way if the indigenous variety be treated better it simply produces leaves. The improvement of the cotton produced in this country can only come about after the general system of agriculture is raised to a higher standard.

Shallow culture prevents improvement of Cotton.

37. On the west and south of the Pennar and Chitrâvati, a considerable tract of country lying alongside the Railway in this taluk is covered with soils of a loamy character, in some places filled with salt. In these lands a very large number of wells have been sunk, many of them watering very large areas, the water supply being extremely good. The chief crop cultivated under these wells is cholum, ragi also being grown to a considerable extent. On the unirrigated lands the chief crop is korra, but in no case does the system prevailing vary sufficiently from those practised generally in the country to call for special remarks.

38. *The Taluks of Râyachôti and Madhanapalle, and Palmanair in North Arcot.*—I propose referring to these taluqs together as they all form part of the same tract of country, elevated from 1,500—3,000 feet above the sea, and possess soils of a very similar nature, and the farming pursued on them is almost the same throughout. A reference to the statement of my route will show that I passed through the taluks from nearly N. E. to S. W. As I travelled almost the whole way by night I did not see so much of the county as I might otherwise have done, but I was able to gain a fair idea of its nature during my halts.

Description of locality.

39. In the Cuddapah District, this table-land gradually rises towards the west, until joining the Mysore country. It is however much broken up by small

rocky hills into numerous small valleys, in the bottoms of which lie patches of rich soil consisting of the washings of the hills and slopes around. Where the country is more open, as it is around Ráyachóti, the soil is of very poor quality, being chiefly a sandy loam, easy to work, but requiring considerable supplies of manure, and a fairly abundant and evenly distributed rainfall for the cultivation of it to be successful.

Great number of tanks in the valleys.

40. Owing to the hilly nature of the country, great opportunities exist for forming tanks to retain the water which naturally runs rapidly off it after rain. Many of these tanks are extremely small, and in many cases, as they are constructed in chains down the different valleys, the breaching of the top one, which not infrequently occurs in times of heavy falls of rain, is almost sure to be followed by that of all the lower ones, so that a train of ruin travels down the valleys, which otherwise would have produced abundant crops of food for the people. Many of the tanks are private property, and few, comparatively speaking, are purely that of the State.

Desirability of maintaining tanks in this locality.

41. Looking at the nature of the country, and the soils prevalent over the greater part of it, it must be always advisable to do everything that is possible for the upkeep of these tanks, for the irregularities of the rainfall in this country can only at present be met in such a locality by means of tanks and wells. These tanks however require constant inspection from persons individually interested in their upkeep. The repairs they need are such as do not usually require skilled superintendence, and are understood by the people themselves. These facts point to the advisability of leaving the responsibility for their repair in the hands of the local Revenue authorities, and of giving these officials power for the inspection of private tanks the breaching of which would endanger others, which are more or less public property.

Inadequate amount of water in tanks.

42. The smallness of the greater number of these tanks renders it a frequent occurrence, however, that the water in them does not suffice to mature a single crop of paddy; in fact, some tanks which I saw I was informed required replenishing two or three times during the year for this purpose. Seeing that the people as yet have no idea of raising any other crop than paddy on the irrigated land, any means which will eke out the tank supplies, which are now more commonly deficient than otherwise, should be adopted. One such means is the sinking of wells in the irrigated lands. As these lands all lie in the chief lines of natural drainage, such wells would intercept much of the subsoil water which now drains away and is lost to the higher lying lands where it is so much wanted, and runs away to the low country where it is far from being fully utilized, nor is it so much required. From the nature of the country and the distance it is from the Railway, it is very liable to suffer disastrously from the effects of drought as was clearly seen in the late famine.

Advisability of sinking wells in irrigated lands.

Do wells draw water from tanks?

43. It is, however, often asserted that wells sunk in irrigated lands below tanks must always draw their supplies from the tank. Did they however draw very large supplies from the tanks above them, these wells would overflow when the tanks were full, and the water in them is standing at a much higher level than that of the land where the wells are situated. As they do not overflow, and they could only do that in cases when the land in which they are sunk was so saturated with soakage water as not to require irrigation, they can scarcely be said to draw more water from the tanks above them than that which naturally soaks slowly away by subsoil drainage. Again, if these wells were altogether dependent on the tanks being full for their supply, the idea of their draining them demands that when the tanks are empty they must be so also. This however is far from being the case. Of course there always must be a certain amount of soakage from the

Natural soakage only utilized by wells.

tanks, and the wells below them must always intercept a great portion of this, and by this means utilise what is now altogether lost to the locality, and also in some degree make use of the water which remains in the tanks after they have been emptied down to the level of the sluices. The beds of tanks being usually covered with very fine alluvial mud, of a clayey nature, are usually very impervious, and consequently the soakage is small. It may, I think, on the whole be admitted that wells sunk in irrigated lands below tanks do not draw from their supplies in the tanks to an injurious extent, and also it is most probable that wells sunk a 100 yards from the tank bund are more likely to draw their supplies from the tank than those which are close to it.

Such wells check waste.

Wells below tanks not dependent on them for water-supply.

44. Of the value of wells sunk in the situations referred to there can be no dispute. They intercept and render available the water of subsoil drainage. By their use the ryots are able to prepare their lands and sow their crop before the tank receives any supply of water, and again after the tank supply is exhausted the well water not infrequently enables his crop to mature when without a well it would be altogether lost, and the Government rent of the land for the year with it. When a ryot can get water by gravitation from a tank, he will never go to the expense of lifting it from a well, so that there can be no danger of his objecting to pay the "irrigated" rent for his land because he has a well. If wells sunk under tanks acted like "artesian" wells, they should of course be prohibited, but that this ever occurs is not, I believe, the case. As a natural sequence to the above remarks, I conclude that every encouragement should be given to ryots for sinking wells in their irrigated fields in order to render their crops and the Government revenue more certain.

Great value of wells in irrigated lands.

45. The cultivation of the irrigated lands in this tract is not of a high order. The cropping consists chiefly of the perpetual growth of paddy year after year, alternated, in cases when the water supply is sufficient, with a second crop of ragi or cholum, or a crop of sugar-cane. The latter crop is taken, where it is possible to do so, about once in not less than three years, but in some parts its cultivation is decreasing owing to the stoppage of the local distillation of spirit from the molasses; this is particularly the case around Madhanapalle. In ordinary lands where paddy only is grown, a fair amount of manure is used, these lands in fact receiving all, or nearly all, that the ryot makes; he also obtains large quantities of leaves, particularly those of the *Pongamia glabra* of which very large quantities are collected, the trees being grown specially for the purpose of supplying these leaves. The leaves are trodden into the soil green, and thus act as a *green manure* to the land.

Cultivation on irrigated lands.

46. In the preparation of the paddy fields no particularly-marked practices exist to distinguish the system practised here from that found elsewhere in the Presidency. After reducing the soil to a state of liquid mud-puddle the leaves and manure are applied and the seed sown broadcast immediately. Seedlings are not raised and transplanted into the fields, although this practice would often save time when time is very precious, whilst it must be remembered that a crop being a fortnight earlier or later may make all the difference between a fair return and failure, or at the least a bare remuneration for the labor bestowed.

Growth of paddy.

47. I found here, as I did in Trichinopoly, the superstition existing regarding the fortunate days for the sowing of this crop. On three days of the week only is it considered right to put in the seed, on the others it is not done. Another superstitious practice also prevails; it is performed shortly before harvest, and consists of the slaughter of a sheep, for which purpose several ryots club together, and taking the blood of the animal they mix it with some rice and scatter the mixture over the crop after it comes into ear. By this means they believe that the produce will be increased.

Two prevailing superstitions.

Treatment of paddy during growth.

48. After the seed is sown the fields are allowed to dry until the sprouts are about 2 inches high, and from that time till harvest it is considered necessary for success to keep 2 or 3 inches of water on the land. Thus the amount of water used is far in excess of the actual requirements, but this waste is so general throughout the country that it is not a feature to mark the locality now under reference. The paddy fields, however, are usually more or less terraced and lie in valleys where the natural drainage is very effective, and at the same time the ryots like to keep the water in their fields in constant movement, and for that reason maintain, whenever they can, a regular flow from field to field. These last-named practices are very good, but if they were adopted in moderation would be much better; as at present pursued they cause great waste of valuable water, but are nevertheless better than allowing water to lie on the fields until it disappears by evaporation or soakage (unless the latter be very rapid). When the crop is about 6 inches high it is crossed with a rake, apparently in order to thin the crop, which the excessive amount of seed used generally causes to be too thick on the ground.

Good practices perverted to bad ones.

The ragi crop on irrigated lands.

49. The cultivation of ragi as a second crop on irrigated lands is of course limited to those areas which possess a good water-supply, and generally the water for this crop is obtained from wells by baling. The crop is transplanted from seed-beds, the land being ploughed up when moistened by the rain and then manured to the extent of the manure available, ten cart-loads being considered a fair dressing, but the amount used varies of course with the amount of stock possessed by the ryots. The depth of tilled soil does not, I think, exceed about three inches. After the manure has been applied, it is not infrequently left for a few days before the water is let in, which is done immediately before planting out the seedlings. During the growth of the crop, it is said to require watering about once in 7—10 days, and to be weeded once. The last is a most expensive operation, as it is done either by hand-pulling or with a small iron crook, which has a blade about one inch wide. Sometimes, however, the ragi is sown directly in the irrigated fields, and then the seed is always broadcasted. With the same crop on irrigated lands it is usually drilled in, but the only reason which is given by the ryots for not adopting the latter practice on the irrigated lands is that such is the *custom* of the country. Not being customary to drill the seed, it is never tried. With custom so strong it must truly be the work of long duration to effect any changes in the practices of these cultivators.

Method of weeding.

An inexplicable custom.

Cholum.

50. Besides ragi, cholum is grown as a second crop on the irrigated lands in this locality, but its culture is not marked by any characteristic practices.

Growth of Wheat.

Wheat is also grown to a small extent, and with it the ryots have to adopt better treatment than with either of the former crops. The land is crossed and recrossed with the native plough very often, and the land is well manured, both by folding sheep on it, and by the application of the usual cattle manure. The wheat grown is spelt wheat. It is watered about twice a-month, being grown during the season when rain is expected. The crop is not taken in perpetual succession, but is only alternated with paddy, and is only grown on the better soils.

Cultivation of Sugarcane.

51. Sugarcane, which is also grown on the irrigated lands, occupies the land about a year. In the preparation of the soil for it, considerable care is exercised, and large quantities of manure are applied. The manures used are cattle and sheep manure, the flowers and the refuse oil-cake of the *Pongamia glabra*, and fresh cattle dung. The land is ridged and the cuttings planted, laid flat in lines about 18 inches apart, four or five joints being allowed to each cutting. During the growth of the crop it is watered between every second row, so that a high ridge

and a water furrow are formed. Water is applied about once in four or five days. To prevent the attacks of the jackals several stems in each plant are tied up together with leaves of the cane.

52. On the unirrigated lands of this tract, the staple crops are cumboo and ragi, the former being more generally grown in the Cuddapah District, and the latter being almost solely grown in the Palmanair Taluk. The cumboo crop, when I passed through the country, was looking poor and very patchy, owing to want of rain. These crops are seldom sown alone, the cumboo being usually mixed with a number of pulses, a mixture of nine sorts of seeds being frequently sown. The following is a mixture which I found being sown in some places, and is called *Navadaniyam* :—

Cropping of unirrigated lands.

Cumboo (*Pencillaria Spicata*).
Horse-gram (*Dolichos Uniflorus*).
Green-gram (*Phaseolus Mungo*).
Bengal-gram (*Cicer Arietinum*).
Dholl (*Cajanus Indicus*).
Mochaicottai (*Lablab vulgaris*).
Caramani (*Dolichos Simensis*).
Gingelly (*Sesamum Orientale*).
Roselle (*Hibiscus Subdariffa*).

The ragi crop is usually sown mixed with Mochaicottai, this pulse being put in in lines, without reference to the ragi crop, being dropped in a furrow made with the native plough. Occasionally a crop of castor is taken on these lands, but the area under the crop is not large. In a few places I saw cotton bushes amongst the cumboo crop. Gingelly is also grown to a small extent.

53. The system of cultivation on these lands is not remarkable for any characteristic differences from that pursued generally in Southern India. Manure is only applied to the lands when no demand for it exists from irrigated or garden lands, and then only in small quantities, ten cart-loads being considered a fair dressing. The practice of sowing a mixture of crops is a good one; for it both in a measure serves the purpose of an alternation of crops, in that the plants grown being of different orders make different demands on the soil, and also the variety of crop in some degree makes the ryot less liable to suffer from total loss of return from his lands. At the same time as the pulses, &c., ripen at a different time from the main cereal crop, the work of harvest is extended over a longer season, and thereby useful employment for the ryot and his family is increased.

Manure used.

Advantages of the mixture of crops.

54. The cereal crops are sown variously by drill and by hand. The former process being adopted when the land is sufficiently dry for the purpose; the latter, when it is more or less soaked by heavy rain to such a degree as to render the working of a drill a matter of difficulty, even if it did not injure the land in its passage. Drilling is of course the preferable process, but one of its great advantages, the decreased cost of weeding drilled crops, has not yet been discovered in this locality, for the ryots say that the cost of weeding is the same whether a crop be drilled or broadcasted. This is the natural result of their method of weeding as described above. With proper tools the reduction of expense in weeding a drilled crop is very great, whilst at the same time the benefits of inter-culture are brought into play. The amount of seed sown for the ragi crop is admitted by the ryots to be too great, but they have not the means of controlling the supply properly in their drills, and consequently have to harrow across their crops when a few inches high, in order to remove part of the surplus plants. The great power which the ragi plant has of tillering, marks it as a crop requiring a very small amount of seed to be sown.

Methods of sowing the seed.

Expense of ryot's method of weeding.

Waste of seed in drilling.

55. I may remark here on the small differences of practice between the system of farming in the Trichinopoly District and in the one now under reference Excepting that in the former the use of the drill is unknown, they are exceedingly

minute, the slight modifications pursued on the black clay lands being alone well marked, the better farming around the town of Cuddapah not being at all typical of the district as a whole.

56. It will be seen that I did not visit the taluks of Pullampét, Sidhout, Budwel, Proddutur, Pulivendala, or Kadiri, whilst I only passed through a corner of the Vayalpad Taluk, the time at my disposal, a month, not allowing me to do more. In the following paragraphs I shall make a few general remarks on features common to the whole district.

Description of cattle found in the district.

57. *Live Stock.*—In the two great divisions of the district, the cattle in common use differ greatly. Around Cuddapah and on the cotton plains the cattle are almost all of the Nellore breed, tall, bulky, clumsy, flat-sided animals, which however possess great strength, and when cared for are useful beasts. They are imported from the breeding districts in Nellore, being brought over annually by drovers who seldom obtain full payment at the time of sale, the purchase money being spread over several years. The cattle are brought over when just ready for use and are said to last about eight years. Above the ghats the prevailing description of cattle is the small breed common to the South of India, intermixed with a considerable proportion of those of the Mysore breed, so that the cattle-power is of a high average quality.

Punganur cattle deteriorating.

The Punganur breed of milch cattle is said to be rapidly deteriorating, even if it is not quite extinct in a pure form. Whether this breed deservedly possesses a reputation for milch producing powers is a point which I am very desirous to determine, and shall make endeavours to do so as soon as possible by obtaining some cows from the native locality of the breed.

58. The injurious effects of the use of any bull as a sire are well known, and why, in order to prevent this in some measure, compulsory castration of all but well-developed animals might not be resorted to, it is difficult to see. The proceeding would not be a hardship to the people, whilst, as a general benefit to the country, it would be a very great advantage.

59. The sheep of the district are not remarkable for any excellence. I saw a few fairly woolled sheep near Madhanapalle, but I did not come across many sheep in the course of my tour.

In folding the sheep on the land hurdles are not used in this district, the flock being simply herded on a particular part of a field during the night.

No fixed lambing season is known, owing to the universal practice of letting the rams and ewes run together; but the shepherds acknowledge that the best season for the lambs being dropped is February.

Ploughs in common use.

60. *Implements.*—The native plough, or scarifier as it should more properly be called, used in the district does not differ essentially from the usual pattern. Three different sizes of it are in use—the smallest for the cultivation of irrigated lands when being prepared for the paddy crop, a rather larger one for the ordinary tillage of the unirrigated lands, and a larger and heavier description for occasional use on the black clay soils as has been mentioned above. It takes about four days of seven hours each to cultivate an acre once with this implement.

Description of the bamboo drill.

61. Next in point of importance is the ordinary bamboo drill, consisting of a small wooden hopper, perforated with holes which communicate with bamboo tubes below, into which the seed is fed by the hand. The seed, passing down through the bamboo tubes which radiate from the hopper, is deposited in the soil by a number of similar perpendicular tubes which are fixed in a beam of wood which receives the lower ends of the bamboos which communicate with the hopper. To the beam mentioned, the draught poles, which are two converging to the point where the yoke is attached, are fixed, as well as a single stilt which is used for directing the implement. The whole machine is very simple, and costs from 7 to 12 rupees. The perpendicular tubes below the cross beam are sometimes fitted

with iron coulters, and the implement is then also used as a rake or rude harrow.

Work done with drill.

With this machine from two to five acres can be sown daily, the area being, of course, dependent on the speed at which the cattle travel and the breadth of the implement. Usually the number of lines sown is five, that being as many as the arrangement of bamboo tubes will allow of; these lines are usually about nine inches to a foot apart; but the distance between them varies in different localities, and for each arrangement a separate machine is required as it is not adjustable.

62. It is striking to remember that drilling in seed has been practised, for how long we cannot tell, in this country, whilst the invention of the drill in England can only be dated back about 150 years to Jethro Tull, " the father of modern agriculture." But simple and low priced as it is, the native machine possesses several points which greatly decrease its value. As I have already noticed, control over the supply of seed there is none, and consequently in the case of small grains there is a great waste of seed, and there would be more did not the owner always attend to the feeding of the machine himself. To overcome the excessive thickness of the crops sown by this machine the ryot is obliged to tear up a considerable portion of them by means of a large rake which he uses for the purpose. Again there is no means of regulating the depth at which the seed is deposited in the ground, and consequently the germination of it and the growth of the crops afterwards is injuriously influenced. Its inadjustability is another drawback to its value.

Defects of the machine.

63. The saving of a small quantity of seed per acre annually would realize a good interest on the capital necessary for the construction of a machine of slightly greater prime cost, but of far greater efficiency. That no steps have been made to improve this machine by the native cultivators during many centuries may well be contrasted with the progress made in the same matter in Europe. It however shows that either the native ryot originally copied the machine from some one else, or that in former days his inventive faculty was more highly developed than it is now.

64. Of other implements I may mention, the guntaka or scraper to which I have already alluded, and several descriptions of rakes, built of wood, and of wood and iron together, used for the purpose of cleaning the land, and pulverising the soil, and also for the cross culture necessary in the raggy crop to remove the superabundance of plants.

65. The only tools in constant use are the mammotti, crowbar, sickle, and a small hoe about one inch wide, with which, squatting on his heels, the cooly digs up the weeds amongst his crops. The mammotti is short-handled and large in the blade.

66. *Water-lifts.*—The only water-lift in use amongst the ryots is the single mhote—*Kapella* or inclined plane-lift. The evil effects on the cattle of this method of raising water, when they have to back up a steep slope, have been frequently pointed out, but in the district under report where wells are at all deep (over 20 feet lift) it is general to employ two pairs of cattle at each; one quietly walking back up the slope, whilst the other is engaged in raising the bucket full of water; a man unhitching the lifting rope from the yoke of the cattle as soon as the bucket is empty and running back up the slope with it attaches it to the yoke of the second pair of cattle which are by that time ready for him to do so. By this arrangement the work goes on more quickly and the cattle are saved from great strain, and were it not for the loss of cattle-power which the system involves would not merit any alterations. As it is at present, the supply of cattle available is far greater than the demand for baling from the wells, and so, although the double mhote is a more economical water-raising arrangement, the ryot has at present no peculiar inducements for him to invest the necessary capital, even if he has it, in a machine, the adoption of which would cause his cattle to be idle for two-thirds of their time.

Arrangement of two pairs of cattle for single mhote.

Waste of cattle-power.

The picotta is not used in this district.

67. *The Ryot.*—In this district the cultivators are, as a rule, altogether illiterate, despising and rejecting all education for their sons, as being likely to unsettle them and lead them in turn to despise the vocation of their forefathers. They ask " Of what use is writing, if our sons cannot plough and work on our fields properly?" This objection is one which has been met with amongst the rural populations of nearly all countries. At the same time the adherence to custom, which is so strongly developed in this country is, I think, more powerful in this district than in the south. The obstruction, which this feature has presented to agricultural progress in all countries, is well known, and it might almost be said that the persons in the old story,* which is often quoted to exemplify this in England, could have been a Government official advocating the use of a European plough, and a ryot of this country replying to him. But no doubt to a certain extent, " It is," as Wren Hoskyns says, " a mistake to attribute these things to obstinacy, or any unwillingness to adopt an improvement that *can be perceived:* it is in the perceptive faculty that the impediment lies—a faculty which will not act of itself, without exercise," and one which the circumstances of the life of the ryot do nothing to develope, but much to deaden. Causes and effects follow so slowly in agriculture, that the difficulty of following out the teaching of experiments is very great. If we add to these agencies the extreme poverty, the manifold superstitions and other influences affecting the ryot, it is difficult to reasonably expect that in the longest life of effort for agricultural improvement much can be effected in the modification of his present practices, unless pressure is brought to bear on the cultivators by their landlord—the State.

Uneducated and bigoted.

Force of custom.

Reasons why farmers adhere to old customs.

Peculiar reasons in case of the ryot.

68. The amount of capital which the ryot possesses is generally extremely small; and were he willing, he would not be able to make many experiments with changes of his system, which he has at least found to bring him means of subsistence in ordinary seasons. If by any means new men—men not born and bred in it—can be induced to embark in agriculture, and to bring to it such a reserve of capital as will enable them to attempt things, which the ordinary ryot cannot from his circumstances adventure on, then can more rapid progress be expected, for such men " often form the most intelligent of husbandmen." As an old writer on English agriculture observes: " They have more zeal and fewer prejudices to surmount, than those who have been brought up in it from their infancy. Their closer attention and freedom from the influence of habit make amends for their first ignorance of minutiæ; and being driven to the pains of really *studying* their pursuit, they form their ideas upon its guiding principles." Such a man is Mechi, who has achieved such success at Tiptree in Essex.

Want of capital.

69. Thus it is, I believe, almost hopeless to attempt to influence the present race of ryots, or even their children, as long as they resist their being educated even to the slightest degree. Model farms as examples to the ryots, and the operations conducted by Government agency, whatever they may be, will be, and are, I believe, looked upon by the ryots in much the same way as the proper arrangement of his horses was by the poor man in the story referred to above. The diffusion of agricultural information amongst the educated ryots through the schools, and by means of employing in the subordinate revenue posts only such men as are acquainted with the true principles of agriculture, will do much. But if any marked improvement is to be effected, it must be from the infusion of new blood into the cultivating classes, and how

Little to be hoped for from present race of ryots.

New blood required if farming is to advance.

* This well-known story is that a certain nobleman, who, seeing a man ploughing a light soil with four horses in a line, got off his horse, unhooked the two leaders, harnessed the two others abreast, and ploughed a few furrows out with his own hands, intending to show how easily it might be done by a pair. " Ah! it's all very well for you that can afford it," said the man; " but those new fangled improvements are too expensive for a poor man."

this is to be done it is difficult at present to see; unless it be that those men, who, after obtaining a State education in schools of a high character, are disappointed in obtaining Government employment, at present almost their sole ambition, will turn to agriculture as giving them an opening for an honorable profession, which will afford them a fair prospect for the future. But amongst these men the want of capital is very great, and without that no great steps towards improvement can be made.

What is really wanted.

70. The problem then reduces itself to the attraction of a greater amount of capital to the land and to the inducement of natives of the higher classes to embark directly in a pursuit which has until now been looked upon as the proper employment for serfs. To induce attention to the honorable position which an agriculturist occupies, to foster an interest in his pursuits, to offer persons, who have had their attention turned to husbandry, an opportunity of acquiring the best possible knowledge of the science and practice of that art, and attempts to induce such attention, together with endeavours to scatter agricultural information broadcast throughout the country, are all objects which will bring Government a return, but from which it is hopeless to expect immediate results; and, considering the position the active occupation of a farmer occupies at present in the estimation of the native community, can only be hoped to bring forth results if most carefully fostered and watched over by the State.

71. It should not be concluded, because I say that progress must be slow, that endeavours must be slacked; on the contrary that very fact should cause them to be redoubled; and, although for a time much will have to be left to faith as far as regards results, if the work be carried on a well-devised system, which can reach to all parts of the Presidency, confidence may be firmly placed on the fact that, as the Board observed in their Proceedings, No. 5,223, dated 13th December 1877, "great progress towards results may be made."

(Signed) CHARLES BENSON, M.R.A.C.,
Acting Supt., Govt. Farms.

PROCEEDINGS OF THE BOARD OF REVENUE, dated 10th October 1881,

No. 1935.

Read—the following Proceedings of the Madras Government, Revenue Department, dated 18th May 1881, No. 785.

Read—the following Proceedings of the Board of Revenue, dated 10th February 1881, No. 227.

Read—the following letter from C. BENSON, Esq., M.R.A.C., Acting Superintendent of Government Farms, Madras, to the Secretary to the Board of Revenue, dated Bellary, 12th August 1880, No. 74:—

I HAVE the honor to submit the Annual Report on the work of this department for the year ending 31st March 1880. The report was forwarded to the Press on day of the date which it bears, and, though much shorter, has taken longer to print than last year's report; it would also have been sent to the Press considerably earlier had not considerable delays occurred in compiling the tables given in the appendices.

ENCLOSURE No. 1.

The Annual Report of the Superintendent of Government Farms for the Year ending 31*st March* 1880.

INTRODUCTORY.

THE season of the past year was very favorable generally to agricultural operations, and was one marked by revived energy in farming pursuits. No extension of the work of this department, however, took place, and its scope remains the same as it was three years ago. * * *

2. As considerable misunderstandings as to the nature of the duties of this department frequently arise, it will perhaps not be out of place for me to give a short summary of them. They mainly consist of the following branches:—

(1.) The direct management of agricultural education.
(2.) The inspection of tracts of country and the preparation of reports on their agricultural conditions and capabilities.
(3.) Conducting the farming operations of the Saidápet Farm, and of such other farms as may be established.
(4.) The introduction and distribution of seeds, &c., likely to be of value in the Presidency.
(5.) The management of Agricultural Exhibitions, &c.
(6) The preparation of agricultural text-books, reports, pamphlets, &c.
(7.) Answering references on agricultural matters from Government, the Board of Revenue, Government Officers, and the Public.

To these may be added efforts for the prevention of disease among live-stock, the salary of the Inspector of Cattle Diseases having, when the office has been filled up, been met from the funds allotted to the work of the department. There are other duties also which should properly belong to the department, and amongst these may be mentioned the collection and scrutiny of agricultural statistics. * * *

* * * * *

AGRICULTURAL EDUCATION.

5. This is now by far the most important division of our work; in fact, so nearly has our work become purely educational that the anomaly of its being separated from other branches of education has been brought to the notice of Government.

School of Agriculture.

6. Regarding the School of Agriculture a separate detailed report has been submitted, which is not, as heretofore, to be published with our annual volume. No very important changes in its working were made during the year except that the date for admitting students will in future be April 1st instead of September 1st. The system of paying lecturers by fees

is still adhered to, but, from its expense and its comparative inefficiency, must ere long be given up if the institution, which has now become a permanent one, is to be placed on a footing of thorough efficiency.

No passed students employed by the Madras Government.

7. In June last our first class of students completed their course of training and twenty-four received certificates of having passed the examinations of the institution successfully. * * *

* * * * *

9. With a view to offer some inducement to young men to study agriculture, I suggested, as had been proposed before by Mr. Robertson, that our certificate should form a special recommendation for employment in the Revenue branch of the public service, but on this point the Board of Revenue observed that—

"Such a course would give undue support to an agricultural education to the disadvantage of other means of entering the Government service. Furthermore, it would not be calculated to benefit the agriculture of the country, for young men, who had gone through this course only for the purpose of entering Government employ, would be likely to cast the subject aside as soon as their end was attained, and they would have no leisure to practically instruct so as to influence the cultivators about them, and from want of use must shortly forget what they had learnt."

* * * * *

The suggestion did not meet with the approval of Government. * * *

Encouragement of honorary distinctions.

10. Another means of inducing the study of any particular subject is the grant of honorary distinctions, such as degrees, to those who take it up. From its importance, agriculture in this country should not be left without aid of this kind; such is granted to Medicine, Civil Engineering, and General Education; and, perhaps, if Government are not willing to devote a small sum of money towards the encouragement of the study of a profession which has so much to recommend it, some course might be devised to throw open distinctions in agriculture, as in Civil Engineering, to students of the subject. But even such inducements would, it is to be expected, not act so powerfully in the case of agriculture as in that of other professions. And regarding this subject, I may quote Professor J. Wilson, Professor of Agriculture in the University of Edinburgh:—

"Even the inducements of honorary distinctions, and of direct money prizes, seem to operate differently on them than on other branches of the community. The diplomas and certificates of Highland Society are awarded to deserving candidates free of any cost, and carry with the life Membership of the Society; while the bursaries so liberally offered each year by the Society—viz., ten of £20 each and five of £10 each—have never yet succeeded in inducing even half that number of candidates to compete for them. This year, 1879, I am informed there are only four names entered, while there are fifteen bursaries offered for competitive examination."

* * * * *

12. Every effort to get together a sufficient number of students to form a fresh class of students in September last failed. The causes of this failure are discussed in the report on the working of the College, but the chief cause no doubt was the sudden reduction of the pecuniary inducements to students.

Model farms as an educational means.

13. Early in the year it was proposed by the Board of Revenue that a portion of the Saidápet Farm should be set apart for the purposes of carrying on a commercial farm, as they held "that a well-devised system of Agricultural instruction must necessarily embrace a demonstrative comparison of profits" between native and improved farming, and in this view the Government concurred and directed me to suggest how the purpose could be attained in connection with the School of Agriculture. In reporting on the matter I stated that there was no suitable site for the purpose on the Saidápet Farm, and at the same time pointed out several misconceptions which surrounded the subject. I showed that as an educational means the comparison of profits had not of late years been considered a necessity in England, Germany, or America, where at first model farms were almost always looked upon as necessary adjuncts to Agricultural Colleges, and I remarked that the assimilation of portions of our practice must be left to students themselves, and pointed out that our object was simply to demonstrate those principles of agriculture which hold good under all conditions. I also stated that I thought it as yet greatly premature to venture to attempt to set before the native farmers a "Model Farm," that is, a farm, the whole system and practice of which we definitely advise them to adopt. At the same time I expressed my belief that there is little hope of the effects of the force of example influencing the present race of ryots; but that, as the Board had themselves remarked, we can "expect much from the establishment of Educational and Experimental Farms in some of the districts," and that "the main effect to be looked for from such farms

Premature to attempt.

Small effect of example.

should not be the impressions made on the adult agriculturist by a few successful examples;" the agricultural community generally in this Presidency at least not being in a position to apply and profit by the lessons to be learnt from the operations of the Model and Experimental Farms to any appreciable extent, save by slow degrees.

Best method of testing system.

14. I showed that in our reports we frequently show the actual charges on and returns from different fields and crops, and this is, I believe, the best method of testing the advantage the system would be to the ryot, whilst it is admitted that under the systems we are carrying out there is a greater certainty of crop, and therefore greater benefit to the State. I also stated that I doubted whether, if our accounts of a commercial farm were published, they would carry conviction to the minds of any native farmers, for I believe that they would always be cavilled at, as accounts such as those referred to above have been, and I pointed out that the peculiar circumstances of a Government Farm, which require a large expenditure on "appearances," where all things are bought at a premium and sold at a discount, where it is impossible to obtain full labor from coolies, and many other things, all militate severely against its "commercial" success. On this last observation Government remarked that there was no reason for such a state of things, but I believe that it is a universal experience; and is especially caused by the high price of labor, when coolies are not working for themselves or for persons of their own color. I may also add that very frequently the crops raised by the ryot are grown at what would be a loss if his pay were calculated at rates such as must be paid by Government. The proposal was given up.

Commercial position of a Government Farm.

Efforts for the dissemination of agricultural knowledge in the mofussil.

15. In September 1871 Government expressed the opinion that the time had then come when they might, with confidence and advantage, extend their operations over a wider field and afford to the agricultural interests of this Presidency the benefits and aids of the teachings of scientific agriculture, and it was resolved to start experimental farms of considerable area in various districts. Up to the present time this scheme has in no particular been set on foot, "partly," as Government observe, "in consequence of unexpected difficulties in obtaining land of sufficient area in suitable places, and partly because it has proved impossible to find as yet among the natives of the country persons who are qualified to undertake the management." * * *

Urgent necessity for doing something in this direction.

16. If it be incumbent on Government to provide agricultural education in this country, and this is now generally admitted, it is particularly necessary to furnish it in an elementary form in the districts, where there is some chance of reaching the rural population. This has been impossible till recently owing to the absence of educated teachers; but, now that we have a system which is capable of turning out competent teachers, it should, I submit, be the object of Government to establish elementary agricultural education rather than, unless both can be conducted simultaneously, to push forward higher education of the nature we are giving in the School of Agriculture here, and to endeavor to benefit the greatest number possible, if only in a small degree, and thereby recoup the heavy expenditure incurred in training the students here; whilst at the same time some of the funds contributed by the different districts to our work would be expended in them for their benefit. The chief aim of Government should therefore now be, I submit, to provide every district in the Presidency with an agricultural class in its chief school as fast as competent teachers become available; and attention to the subject of agriculture should be drawn by offering prizes to those who show proficiency in it in the schools, and this might be especially done by means of scholarships to enable successful students to proceed to the School of Agriculture to increase their stock of knowledge, and by making agriculture a test for entrance into the Revenue Department.

Partial adoption of a scheme to meet the want.

17. Shortly before the close of the year Government decided to adopt a suggestion of the Board of Revenue, made in reviewing a scheme submitted in order to attain the ends mentioned in the preceding paragraph to start agricultural classes in three mofussil schools "experimentally;" * * * . The scheme for working these classes has yet to be developed; but, it is not necessary for me to show, how utterly inadequate to the wants of the country must the location of three isolated classes in the mofussil prove.

18. The only step in advance which was made during the year in this branch of our work was the recognition of the value of agricultural education shown in the new Educational Grant-in-Aid Code, whereby our certificate-holders will be qualified for earning salary grants for teaching agriculture.

AGRICULTURAL TOURS.

Tour in Cuddapah and North Arcot.

19. The only tour made during the year by any officer of the department was one I proceeded on in the month of August in the Cuddapah and North Arcot Districts, for which I left my head-quarters here on August 2nd, returning again on September 1st, so as to be on

the spot at the time of the reopening of the School of Agriculture for the Winter Session. Owing to the short time at my disposal, I was not able to see nearly the whole of the districts named, and visited only the following taluks and places in them :—

Taluks.	Places visited.
Cuddapah	Cuddapah, Kázipet, and Kamalápuram.
Jammalamadugu	Muddanúr, Jammalamadugu, and Kondápuram.
Ráyachóti	Ráyachóti.
Váyalpád	Gurramkonda.
Madanapalle	Madanapalle.
Palmanér	Palmanér.
Gudiyátam	Gudiyátam.

The places named were the centres from which I inspected the localities in their neighbourhood.

20. My report was completed by September 20th, and submitted through the Collector of Cuddapah in a printed form before the end of October, but had not reached * the Board by the 1st of April. The tour was a very hurried one, as I had only a month at my disposal for the work, my presence being necessary at Saidápet as soon as the School of Agriculture reopened, and I was unable to leave Saidápet earlier owing to there being no other officer on the spot to take charge of the farm. From the nature of the tour I was unable to collect sufficient information to enable me to discuss the agricultural condition of the district, and confined myself to notes on what I saw and learnt of the farming operations of the ryots; it was a matter of regret to me that I was unable to do more, for I do not consider that Government derived full benefit from such a tour of inquiry when the scope of my observations was so limited.

Hurried nature of the tour.

21. The necessity for officers of this department making a detailed study of the agriculture and agricultural condition of the Presidency has often been urged, and a small commencement has been made in Mr. Robertson's Coimbatore tour and mine in Trichinopoly, besides that in Cuddapah referred to above. It is, however, plainly evident that, unless the work be more strenuously undertaken, but little progress can be made. Now that the School of Agriculture is in full work, the Superintendent of Government Farms, being in charge of it, will be unable to proceed on tour excepting during the vacation—July and August—and even then the time at his disposal is short, and his absence from head-quarters will not always be possible. The time of a special officer working something on the system of the Geological Survey Officers would be valuably employed in such work.

Necessity for studying native farming.

* * * * *

THE SAIDAPET EXPERIMENTAL FARM.

23. The Board of Revenue having sanctioned the publication of the results obtained in the working of this farm in a more convenient form than the annual report, as a portion of a volume of "Records," it is not necessary for me to do more than briefly summarize the proceedings of the year, matters of permanent interest finding their place in the records; at present, however, the amount of matter available is so small that it is improbable that a volume will be issued for some time.

Introductory.

24. *The Season* of the year under report was on the whole favorable for the farm; the total rainfall registered was 56·95 inches falling in 82 days; the average of the previous 10 years having been 50·74 inches collected in 64·3 days; the excess was chiefly due to very unusual rains which fell during January and February last. The rainfall was tolerably well distributed except that on few occasions a great amount fell in a very short time, which did great damage to standing crops and to the fields by washing the surface, but was of little value as most of it ran off the surface as soon as it fell, and also that in September there was a great deficiency.

General character of the season.

25. No rain fell in April: a severe storm burst on the locality on the 21st May, during which 3·9 inches of rain fell; the total amount of rain that fell in this month being only 3·99 inches. The storm, which was more notable for the force of the wind than for the amount of rain that fell, prostrated nearly all the plantain trees, carried away bodily the roof of one of the sheds, and otherwise did considerable damage. Owing to the forward state of preparation in which the land was, as explained in last year's report, the rain was readily absorbed and, the surface of the fields being very generally broken up, moistened the ground to such an extent as to admit of a considerable area being put down under hot-weather crops: these were chiefly gingelly and horse-gram sown at the end of May. In June 1·8 inches of rain was registered; all of which fell in gentle showers on eleven days; and was thus of great value, and the month was very

* It was forwarded to Government with Board's Proceedings, No. 545, dated 22nd April 1880.

favorable for the growth of the crops sown in May. The gingelly and horse-gram crops looked so remarkably well at the end of June as to justify the expectation of an unusually good summer harvest.

Unfavorable weather in July.

26. The month of July, however, was most unfavorable for the hot weather crops; the first half of the month was very dry, and the crops that had grown very rapidly under the favorable conditions experienced in June were not hardy enough to accommodate themselves to the abrupt change of conditions; especially the gingelly, which suffered so much during the early part of the month that before the middle of it it had commenced to flower, and soon shrivelled up and consequently produced but little seed. The latter portion of July was more favorable for ploughing, &c., but the rain that fell at that time was too late to be of any use to the gingelly crop; the total amount of rain registered during the month was 1·33 inches.

Season favorable in August.

27. The weather in August was everything that could be wished for preparing the land for cold-weather crops; the exceedingly large amount of rain—7·24 inches—which fell during this month was distributed over fifteen wet days, but was nearly all precipitated during the latter half of the month. The weather continued to be very favorable for the preparation of the land and for sowing cold-weather crops during the first part of September, and with the early-sown crops of cotton, maize, cholum, and Sorghum, put down at the commencement of the month, being placed under very favorable conditions, the seed germinated freely and the plants made great progress during the first stage of their growth. But the bright dry weather predominating during September, which had very beneficial effects on the crops during the early part of the month when there was sufficient moisture in the ground, had a contrary effect after the middle of the month, when the soil had again dried and at the end of it the crops suffered so much that, if the dry weather had continued some days longer, the cholum crops would have perished. The cold-weather crops thus experienced the same conditions as those grown in the hot weather; very favorable weather immediately after sowing, which caused a very rapid growth, making the plants unfit to withstand the effects of the dry weather which followed, and, had it not been for the opportune rain which fell at the commencement of October, nothing would have saved them from a similar fate; the cholum would have been lost as the gingelly was. As it was, the maize sown in one of the rotation fields was induced by the great heat and want of moisture to flower when not half developed and had to be cut down at that time. On the whole, the dry weather in September was the cause of considerable loss to the farm as it prevented the sowing of a large area of land, which in ordinary seasons would have been got under a crop, and thus at the end of the month the work of the farm was in a backward state.

Result of a dry September.

Favorable season in October for growing crops.

28. The month of October was very favorable for the growth of the standing crops; the cholum crops, which had suffered severely during September, revived after the rain that fell at the commencement of October. The total amount that fell in October was 19·13 on seventeen rainy days; about 10 inches of this falling during seven rainy days between the 2nd and 11th and the remaining 9 inches between the 18th and 31st. Although there were only seven rainless days between the two rainy periods, yet on the 18th of October the more sandy soils had become quite dry and the crops growing on them had begun to suffer from want of moisture and the heat; this shows that the evaporation must have been great at that time. Undoubtedly the evaporation was chiefly due to the closeness of surface and the crust on the soil caused by the preceding heavy rain. The almost continuously wet weather during the latter portion of the month kept back sowing operations considerably. The months of November and December continued to be favorable; 11·87 inches of rain fell during November and 5·51 inches during December. A very heavy shower of rain fell on the morning of 23rd December; the shower lasted only about a quarter of an hour, but during this short time such an amount of water was precipitated that some drains overflowed which had never been seen to run full before. November is the month in which the indigo crop is usually put down, but partly owing to the nature of the season, and especially from the comparatively dry weather which prevailed from November 20th to December 23rd, the sowings made were not generally successful, and a much smaller area than had been intended was sown with this crop.

Peculiarity of season allowed late sowing of cold-weather crops.

29. The very favorable weather of December was utilized to put down a large area of crop towards the end of the month and early in January: gram and gingelly were chiefly sown at this time. There being sufficient moisture in the soil, the seed germinated very well, but the plants were soon checked in their growth by the crust of the surface soil caused by intense evaporation. To break the crust the harrow was used with very satisfactory results. The land was generally harrowed across the lines of the crop when it was from one to six inches high. In some instances rain fell immediately after sowing and it caused crusting of the surface soil to such an extent that the germs could not break through; the harrowing, however, broke up the crust and pulverized the surface: sometimes the harrowing was repeated at intervals of a few days, when the soil had become consolidated, by this means the soil was kept in a friable state and a portion of the weeds that sprang

up were eradicated; few plants were damaged by the harrow, and the crops thus treated showed indubitable signs of improvement immediately after harrowing. Some of the crops received no other interculture besides harrowing, especially those sown in close lines.

30. The weather during January was most favorable; being dry during the greater part of the month it admitted of harvesting the early-sown cold-weather crops that had by that time ripened. The 2·3 inches of rain that fell during the latter portion of the month were sufficient to maintain the growth of the crops then on the ground, and the rain—2·5 inches—that fell in February revived those that had commenced to suffer and supplied the soil with sufficient moisture to bring the late-sown crops to maturity. No rain fell in March.

Season very favorable for fodder crops.

31. The peculiarities of the season were on the whole more conducive to the growth of forage than of grain crops. This year so much fodder was raised that at the close of it so large a quantity was on hand that there was scarcely room enough to store it, and the farm-yard now presents an appearance which has probably not been witnessed before. In some of the fields, however, the yield of grain was more than that obtained in previous years; this was the case with the early-sown crops, the late-sown crops not having produced much grain. The cotton, which had on account of the favorable season been sown very early, did not begin to bear until very late, the season having been too wet to promote the production of lint; and the indigo crop was on the whole unsuccessful. The Mylapore Tank-water was this year available until the end of March and, if the calingulah were not so very low, the water would have lasted a month longer. By means of the tank-water some very good crops of paddy were raised at a small cost and in some fields a second crop was obtained. If the calingulah of the tank were raised, the area of paddy land could be advantageously extended. Some of the land which has been laid away under Guinea grass for the purpose of raising fodder and forming grazing ground for the breeding stock, which were to have been kept when the Commissariat slaughter-yards had been removed, could have been profitably cultivated with paddy had it been free for the purpose.

32. Below is given a table showing the rainfall registrations throughout the year, and in Appendix I statements are given showing the weekly and monthly rainfall compared with that of previous years:—

Date.	April 1879.	May "	June "	July "	August "	September "	October "	November "	December "	January 1880.	February "	March "
1	..	..	..	..	..	0·07	..	0·08	..	..	..	..
2	..	..	..	..	..	..	1·40	0·07	..	..	..	..
3	..	..	·15	..	·15	..	..	0·28	..	..	..	..
4	..	..	·02	..	·08	..	5·85	..	0·82	..	..	..
5	..	..	·01	·05	..	..	0·25	0·06	0·44	..	..	..
6	..	..	..	..	..	..	0·02	..	..	..	..	..
7	..	..	·40	·02	..	0·20	..	2·20	..	..	..	..
8	..	..	..	..	·02	0·50	2·09	0·40	..	..	..	..
9	..	..	·50	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	0·16	..	..	..	..	..
11	..	..	..	..	..	0·50	0·38	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	2·45	..	..	..	..
15	..	..	..	·07	1·25	..	..	1·83	..	..	..	..
16	..	..	·05	..	0·45	..	..	..	0·06	..	..	..
17	..	..	..	·38	..	..	..	..	..	..	..	..
18	..	..	..	·08	0·62	..	..	0·50	0·35	..	2·50	..
19	..	..	..	..	0·45	..	0·30	3·30	0·04	..	..	..
20	..	·04	..	..	0·02	..	1·10	..	..	..	..	..
21	..	3·90	..	..	..	..	0·55	..	..	0·45	..	..
22	..	·05	..	..	0·05	..	1·90	..	..	..	..	..
23	..	..	..	·07	..	..	0·10	..	3·70	..	..	..
24	..	..	·15	..	0·22	..	1·60	..	0·10	..	..	..
25	..	..	·13	·05	..	..	0·08	..	..	..	..	..
26	..	..	·07	..	0·06	..	..	..	..	..	..	..
27	..	..	·05	..	0·30	..	..	..	..	..	..	..
28	..	..	..	..	0·75	..	..	..	..	..	..	..
29	..	..	..	·10	1·42	..	0·45	0·70	..	..	..	..
30	..	..	·28	·15	1·40	..	1·85	..	..	0·30	..	..
31	..	..	..	·36	..	..	1·05	..	..	1·55	..	..
Total ..	..	3·99	1·81	1·33	7·24	1·27	19·13	11·87	5·51	2·30	2·50	..

Failure of experiment explained.

33. *Drainage.*—The piece of land drained in the year 1875 and redrained last year gave satisfactory results at first, but during the heavy rains the water in the nullah, into which the drainage water is discharged, rose several times some feet above the outlet for several days. The flood-water entering the drainage pipes stopped their action, and water was repeatedly

observed standing nearly immediately over the pipes for several days after heavy rain. Soon after the first heavy rains in October, it was observed that the pipes discharged but little water, which flow after subsequent rains ceased entirely, although the water in the deposit cisterns had risen nearly to the level of the surface of the land, clearly indicating that the drainage was out of order. The stoppage was most probably caused by the backwater checking the current of the drainage water in the pipes and thus causing the deposit of silt previously kept in suspension as long as the water was in movement. In this case the experiment has not proved successful as an example of subsoil drainage, owing chiefly, if not solely, to the want of a proper outlet which in draining land should always be at a sufficiently high level to prevent any stoppage of the flow of the drainage water during any part of the year. I do not consider that it is worth while to go to further expense on this land, but during the current year another plot of land, situated under more favorable conditions, will be subsoil drained. But, although the drainage did not entirely fulfil the object for the sake of which it was undertaken, there can be no doubt that the piece of land has been greatly improved by the drainage. On a portion of it, which never previously produced a fair crop, this year a very fine crop of gram was grown and a much better one than on the remaining part of the field.

34. *The Rotations* of crops commenced in the year 1877-78, and referred to in paragraphs 16 and 17 of that year's report, were adhered to. The outturn of cotton from Field No. 3, referred to in paragraph 20 of last year's report, was at the rate of 318 lb. of seed-cotton per acre, which, considering the very low manural condition and the bad physical state of the soil, is fair; the plants flowered profusely, but being very small did not yield heavily. The crop was allowed to stand until August, and the land was then ploughed thrice and once subsoiled during the months of September and October and lime was applied at the end of October at the rate of 3,000 lb. per acre. The land was sown with indigo at the commencement of November, but unfortunately the seed available was not good and the season at the time of sowing unpropitious, so that several resowings were rendered necessary; but the last sowing was tolerably successful, and the crop has since done fairly; the first cutting was obtained on the 12th and 14th of April, when seventy-five bundles, weighing 6,644 lb., of indigo plant were obtained. The small outturn was due to the lateness of the sowing; there was a sufficient number of plants on the ground, but they neither grew high nor spread much.

35. The second rotation field, No. 16, was sown with maize and cotton at the commencement of September, it having been manured with box manure at the rate of eight tons per acre. The maize was a failure; the seed germinated tolerably well, but, owing to the unusual weather experienced in September referred to above, the plants commenced flowering when only about two feet high and were then removed. The cotton germinated well and grew very well at first, but its growth was soon checked by the intense heat. The plants suffered severely from the injury done to their leaves, which became covered with red spots, owing either to destruction of their tissues under the influences of the weather or to a fungoid disease; they, however, soon recovered, but began to bear very late. The outturn of lint nevertheless promises to be fair, the details of which will be given in next year's report.

CROPS.

36. Appendix II of this report contains statements regarding crops harvested during the past year :—

Statement A, referring to Food-grains.
Do. B, do. to Industrial crops.
Do. C, do. to Fodder crops.

Below remarks are made which will suffice to show the general results, and any points of abiding interest will be recorded in the volume of records already alluded to.

37. At the commencement of the year the extent of cultivable land on the farm available for arable purposes was 142·04 acres; but of this 27·22 acres were laid down in grass for pasturage and remained so during the year; on the remaining area 37·23 acres of crop were standing on April 1st, 1879; including this the following areas of crop were raised during the year, the figures given showing the state of affairs on 31st March 1880 :—

—	Ploughed in green.	Harvested.	Standing.
	ACRES.	ACRES.	ACRES.
First crop	21·80	80·71	12·31
Second crop	20·80	59·41	12·06
Third do.	3·54	26·30	15·37
Fourth do.	..	9·18	..
Fifth do.	..	3·54	..
Total ..	46·14	179·14	39·74

38. The area of crop raised during the year was thus 227·79 acres; the outturn from some of these was not recorded from various causes, *e.g.*, being grazed down, or used as manure. Twelve pairs of cattle were maintained to perform the work of cultivation, or one pair for each nineteen acres of crop raised; these cattle also performed a good deal of work on the Guinea grass, &c., kept as pasture, and supplied labor for the Botanical grounds, and to a certain extent for such estate works as were in hand.

39. *Food-grains* were raised on a comparatively small area, and may be subdivided into the following three classes:—

Unirrigated cereals,
Irrigated cereals,
Unirrigated pulses,

each of which is separately referred to below.

40. *The area of unirrigated cereal crops* raised during the year was small owing to circumstances already detailed. The outturn from the summer crops of cumboo was very low, and confirms the opinion that they are seldom profitable to raise in this locality; the total area, 10·36 acres, yielded an average of 134 lb. grain and 3,560 lb. straw per acre; the supply of fodder, however, was very useful and allowed of the use of a good deal of horse-gram as green manure. With the cold-weather crops, of which only a small area was raised, the yield was satisfactory, 14·5 acres giving an average of 633·5 lb. grain and 6,647 lb. straw. In the case of Crop No. 8, in the table, however, the yield of grain is very low and much more so than was anticipated from the appearance of the crop; for, although the ears were rather small, the crop was a good one: the small outturn was no doubt partly due to the fact that a series of seed-sowing experiments were conducted in the field, and I think that considerable loss was experienced by petty pilfering, and in harvesting and threshing the crop.

41. *Crop No.* 10—*Black Cholum* (*Sorghum saccharatum ?*) is notable; the seed was obtained

Crop whence derived.

from the Trichinopoly District, and the crop resembles the Chinese sugar-cane very closely, except that the husk of the seed does not adhere nearly so closely to the grain as it does in that crop; whether it possesses the same sugar-producing qualities cannot be settled as yet; but as far as we can tell it does not do so, but this may be due to long continued deficient cultivation. In Trichinopoly the crop is raised on the poorest soils I saw under cultivation there and is the staple food of the people in the southern part of the district. The soil of the Field No. 32, on which this crop was raised, is a sandy loam, well drained, of tolerably

Soil on which grown.

uniform condition throughout, and the differences caused by the levelling of its surface five years ago are scarcely observable now, and most of the trees that then interfered so greatly with the proper cultivation of the land have been removed. The crop followed horse-gram which

Preparation for crop.

was cut for green fodder in the middle of August. There being but little time available for the preparation of the land for sowing, it was ploughed only once, and, after being manured with horse manure at the rate of five tons per acre, was ridged up and sown on alternate ridges with black cholum and cotton. The seed germinated very well and the plants grew very

Growth of crop.

vigorously at first, but, during the dry weather of September, the crop became so much stunted that its loss seemed certain at the end of that month; however, the rain at the commencement of October revived it again and afterwards it grew very vigorously, attaining a

Outturn.

great height and developing remarkably good ears. The yield (1,265 lb.) of grain per acre was very good and one never obtained previously from any cholum crop raised on the farm. Such an outturn shows clearly that the crop is suited to our soil, but must be chiefly attributed to the good condition of the land; the two preceding crops, white cholum—a cold-weather fodder crop raised in 1878-79, and the horse-gram fodder raised as a hot-weather crop in 1879—were not good, so that the soil lost little of its fertility in producing them.

42. *Crop No.* 13—*Planter's Friend* (*Sorghum kaffrarium*).—The field (No. 27) in which

Poverty of soil.

this crop grew is one of the worst on the farm: it was levelled about four years ago, at which time it was necessary to strip the land in some parts more than a yard deep in order to bring its surface to a regular slope. The bad effects of removing the surface soil have been shown by barrenness of the land stripped, the stiffer portions of it having produced little or no crop ever since. The soil varies from clay to sand; the portion stripped most deeply is stiff, and has a very close texture, so that even after a light shower of rain the water accumulates on the land and whenever heavy rain is followed by great evaporation salt rises and is deposited on the surface. The land was ploughed several times between June and August and was as

Preparation of the land.

well prepared for sowing as the diversity of the soil admitted. Horse manure was applied at the rate of nine tons per acre, after which the Planter's Friend was sown on alternate ridges with cotton. The seed germinated freely and tolerably evenly over the ground. The dry weather of September was unfavorable for the growth of the plants, and they appeared stunted

at the end of the month, but recovered tolerably well after the rains at the commencement of October. The yield, 499 lb. of grain per acre, is, considering that the land was unable to carry any other crop before, good. The crop grew on the stiff as well as it did on the sandy soil and in the salty portions of the field. It is the only crop that has grown at all well on the land. Planter's Friend having a very thick and succulent stem is a first-rate fodder crop and yields heavily; and it is more highly valued in America as a sugar crop than the Chinese sugar-cane even.

Outturn from crop.

43. *The irrigated cereal crops* raised during the year were grown on an area of 14·43 acres; of this, 9·23 acres are irrigable from the Mylapore Tank; 3·71 acres are situated in the river bed south of the farm buildings, and the remainder (1·49 acres) was irrigated from wells, &c., with water raised by mechanical agency. On the land irrigated from the Mylapore Tank 12·57 acres of paddy were raised and harvested during or shortly after the end of the year, as well as one acre of raggy grown on land that also produced a crop of cumboo (No. 4 in the table); besides this, on portions of the area, in all 7·7 acres, horse-gram fodder (1·84 acres) and gingelly seed (5·86 acres) were raised, which will be referred to in their proper places. The total area of crop raised on this piece of land was thus 21·27 acres. On the river flat 4·64 acres of paddy were raised and the results are recorded in the table, but there are also several plots in the same place, still carrying paddy of different ages, which are not referred to in the statement.

General results.

44. Crops of Carolina paddy were sown at different times of the year; but, though every care was taken with them, they failed. With Madagascar paddy (see paragraph 56 of last year's report) better results than last year were obtained, Crop No. 18 being a good one. This crop has a very valuable characteristic in that the plants tiller largely, and thus a small quantity of seed will suffice. The crops raised this year matured in a much shorter time than last year, probably because the plant has become more thoroughly acclimatized. The crops of white car paddy were satisfactory: No. 20 was raised on a piece of poor sour land, lying close to the Mount Road, and consequently a portion of it is within the reach of the roots of the fence and trees alongside the road, and these no doubt have an injurious effect on the productiveness of the land; No. 21 was raised on land very similarly situated, but of better quality, and the outturn is very good. Some of the land producing the crops referred to above was manured with a crop of horse-gram ploughed in green, other portions produced a crop of gingelly seed or horse-gram fodder and on nearly all at the end of the year a catch crop of indigo was put down after harvesting the paddy crop; this crop, however, does not appear in the statements.

Satisfactory results with Madagascar paddy.

Good results with white car.

45. *Car Paddy.*—Crops 23—30 were all raised on Field No. 37; No. 23, with Madagascar paddy No. 18, succeeded Carolina paddy No. 14, and was a very satisfactory crop; on Plots II, III, IV, and V crops of horse-gram fodder were raised during the dry weather last year, which will be found recorded in their proper place, and it is very evident that the land was much benefited by their growth, for formerly the land rarely produced a fair crop. Following the horse-gram, gingelly seed was sown on these plots, the outturn from which is also recorded elsewhere. Plots III, IV, and V, it will be noticed, produced a double crop, whilst on Plots I and II a catch crop of indigo was sown after harvesting the paddy. The returns from Plots I (*b*), II, and III are satisfactory, but the others rather low.

46. Nos. 31 and 32 were both raised on the same plot, but with No. 32, on a small portion of fair soil at one end, a small piece of Carolina paddy was grown, which does not appear in the table, as it is standing. The plot is a very poor one, with inferior drainage; and the yield of car paddy is low. A few days after harvesting that crop, the land was again sown with what is called sixty-days' sumba paddy (in reality a ninety-day crop), which matured in eighty-two days. In order to stimulate its growth, the crop received a slight top-dressing of sheep manure when about nine inches high. The outturn is low, but better than that received from the first crop. The plants were attacked by an insect when about nine inches high, which caused the death of many and thus reduced the yield. No. 33, car paddy, was grown on a plot situated close to that mentioned above. The soil is in tolerably good condition and the outturn was fair.

47. Nos. 34—40 were all raised on land in river-bed south of the farm buildings; the surface of the land is nearly of the same level as the water in the river. Crops Nos. 34—36 were raised during the hot weather of 1879, and the remainder early in the present year; as we had no heavy floods during the past season, the last-named crops were grown at a very small cost. The plot (No. 35) that yielded in 1879 at the rate of 930 lb. grain per acre is below the water-level of the river at ordinary seasons; the soil of this plot was in previous years so impregnated with salt that nothing would grow on it. The improvement of the land must be chiefly attributed to a drain cut close to it, by means of which the surface water can be let off and which also provides some drainage. The outturn of straw per acre is high in Nos. 34 and 35, most probably on account of the lay of land; moist ground having a tendency to produce thick haulms but not much grain. The outturn from the crops recently harvested was considerably

better than that obtained last year, showing that the land continues to improve under the treatment it has received, and, the crops having been raised at a very small cost, is very satisfactory.

48. No. 41, Raggy following cumboo (No. 4 in the table) on a part of the same field was raised on a field the soil of which is very much impregnated with soluble salts and the outturn is consequently fair. The crop was occasionally watered.

No. 42, Maize was raised on a part of the same field as Crop No. 9 in the table; it was sown during the hot season with a view to propagate the small amount of grain then available in order to have sufficient seed for sowing during the cold weather. The result, however, was not satisfactory. A great number of cobs were received, which, however, were all very small, each cob yielding on an average only 1¼ oz. of grain, whereas good-sized cobs raised previously yielded more than 8 oz. of grain.

49. *The Pulse crops* recorded occupied an area of 6·42 acres and yielded an average outturn of 147 lb. grain and 1,709 lb. straw per acre. The crops were all, except No. 47, put down together with gingelly very late in the season. They received no special attention during their growth, and consequently cost little to raise. The yield of green-gram, except from Field No. 15, was fairly satisfactory; but our soil is not at all well adapted for crops of this class, and they can only be put down as catch crops on land which remains unsown late in the season, as they will mature with a minimum supply of moisture.

50. Besides the above-named crops 5·48 acres of dholl (*Cajanus Indicus*) were raised, chiefly amongst Casuarina trees for shade, the results of which will be given next year, as the crop was still standing at the end of the year.

51. *Industrial Crops.*—Several of the crops given in the Appendix are those sown in the year 1878, but harvested during the year under report, and consequently the figures do not exclusively refer to the work of the year; during the past year, however, the following areas were put down under the descriptions of crop named :—

	ACRES.
Cotton	16·40
Oil-seeds	31·78
Indigo	3·71
Tobacco	0·50
Sugar-cane	·87
Total ...	53·26

Of these, the results from the cotton and sugar-cane, part of the indigo (1·78 acres) and part of the oil-seed crops (2 73 acres) cannot be given till next year, and these crops are not referred to in the Appendix. Besides this 12·7 acres of poor land were planted out with Casuarina trees.

52. *Cotton*—New Orleans.—The crops mentioned were referred to in paragraphs 52 and 91 of last year's report; the outturn, averaging 449 lb. of seed-cotton per acre, is, considering the conditions under which the crops were raised, satisfactory.

53. *The Oil-seeds* referred to in the table are Castor beans (*Ricinus communis*) and gingelly (*Sesamum orientale*); of the former, Crops 4 and 5 were raised in order to form shade for the young Casuarina trees, but, being put down very late on very poor soil and meeting with adverse conditions, they died off very early and neither produced much seed. Crop No. 6 was raised from seeds grown in the Botanical garden of the Italian varieties referred to in the report of those grounds (paragraph 34) for last year, and is very satisfactory.

54. *The Gingelly crop* may be divided into two portions; the hot-weather crop occupying an area of 21·29 acres and yielding on the average 78 lb. of seed per acre; and the cold-weather crop, which occupied 7·76 acres and the average outturn recorded being 222 lb. of seed per acre. The hot-weather crop suffered during July, as has already been explained, which chiefly accounts for the low outturn recorded, but to some extent it is also attributable to the bad weather experienced after harvesting, which necessitated frequent turning of the plants in the yard to dry them, during which much of the seed was shed and a good deal became mouldy and valueless. Gingelly is always a difficult crop to harvest in unsettled weather as the seed is so easily injured. Crops Nos. 10—14 were raised on ordinary paddy land irrigable from the Mylapore Tank; the soil of all the fields (except 36, which is very poor and sour) is a sandy loam in tolerably good manural condition. The crops suffered from the dry weather of July and the outturn was nearly everywhere very low from the causes referred to above; however, the outturn of 144 lb. per acre in Field No. 35-IV is not bad considering the conditions the crop had to contend with.

Badness of season for hot-weather crops.

Crops grown on paddy land.

55. The cold-weather crops, Nos. 15—20 in the statement, were the first of this crop raised during this part of the year. They were sown very late, in fact after the usual season for sowing cold-weather crops, in alternate double lines with gram; when the crop was

Manner of sowing cold-weather crop.

put down, the chief object of sowing a mixture of seeds was to avoid the risk of total failure which might attend a single crop, especially as the season was too far advanced to admit of sowing any later crop; however, as both crops grew very well both were left to mature. The crops varied, as might be expected, with the varied conditions of the soil. In the loamy and more fertile portions the gingelly predominated, and on the sandy portions where gingelly had less chance, the gram grew well. The experiment was, on the whole, very successful; not only did the gingelly grow very well in most instances, but it was also not directly manured nor even hoed, the only operation performed during the growth of the crop was harrowing several times across the lines for the purpose of breaking the crust and loosening the soil and to thin out the plants which had sprung up rather thickly, owing to the large amount of seed used. The harvesting was much easier than that of the hot-weather crop, for the weather was settled and dry; whilst at the time when the latter was being harvested, which is generally in August or September, there is generally great pressure of work, it being the time for putting down the cold-weather crops, and as the weather is then generally showery, much of the gingelly either becomes mouldy or is entirely spoilt. In this case the crop was harvested at the end of March and the commencement of April; and the season being very favorable, the cost of preparing the seed for sale was very low; all that was necessary was simple turning of the plants over several times in the open yard; by which means all the seed was shed and then only required to be winnowed. The seed raised at this season was sold easily and more advantageously than that obtained from the hot-weather crop. The outturn per acre was in some instances very good; Field No. 34-I yielded at the rate of 511 lb. per acre, a very good crop; it followed a crop of indigo (No. 27 in the table). The lowest outturn was obtained from Field No. 21, the yield being only 98 lb. per acre; the soil in this field is chiefly sand and is in very low manural condition. The gingelly had not much chance of thriving under these conditions, but the gram raised with it was a very good crop, yielding more than 16,000 lb. of fodder per acre.

Treatment of crop.

Facility for harvesting.

Preparation for market.

Outturn of crops.

56. *The Indigo* crops mentioned in the table were all, excepting the last (No. 28), sown at the close of the cultivating season of 1878-79; they were all put down very late and the outturn is very low; those from which green plant was obtained only averaging forty-nine bundles per acre or about one-fourth of a fair crop; in every case, however, except with Crop No. 21, only one cutting was obtained instead of three as usual. Crop No. 25 was raised on a piece of ordinary paddy land; the field is unfavorably situated, the soil is poor and in a bad physical state, and the season was unfavorable; the crop was watered occasionally, and considering the circumstances, the yield in one cutting, forty-six bundles per acre, is not altogether unsatisfactory.

57. The crops raised for seed during 1878-79 yielded but poorly. Crop No. 27, from Field No. 34-I, was grown on a piece of land well situated as regards drainage, and also for irrigation. The soil is a sandy loam in good condition. Immediately after sowing the seed, the land was irrigated, and also occasionally afterwards. The seed germinated tolerably well and the plants spread very much and grew to a great height, many of them measuring five feet. The plants all flowered very well and were thickly covered with pods, most of which, however, were empty; the yield of seed was consequently low. The plants produced very thick stems and branches, which made the cutting difficult; they were therefore cut about $1\frac{1}{2}$ feet from the ground and the stubble was ploughed in afterwards. If they had been cut in the usual way a few inches from the ground the outturn of plant would have been about twice the amount recorded.

58. Crop No. 28 was a very fine one and attracted a good deal of attention from the native cultivators in the neighborhood. The yield of seed, 382 lb. per acre, may be noticed as being very satisfactory and especially so as a considerable demand arose for it. All that could be spared from farm purposes was sold as soon as it was threshed, and much more could have been disposed of if it had been available.

A very satisfactory seed crop.

59. *Tobacco.*—Crop No. 29 is that referred to in paragraphs 79—82 of last year's report, and is simply entered for record; regarding this, and the other crop raised in 1878-79, it may be observed that the leaf was reported on by competent persons as being fairly cured, even in color, and of good smell, but possessing the fatal characteristics (for a cigar tobacco) of burning slowly, not keeping a light well, and yielding a black ash, all defects which I believe can be overcome by treatment of the crop, and with this object some small experiments have been made with different manures in the Botanical garden of the School of Agriculture.*

Quality of leaf produced.

Crop No. 30 was raised on a fair piece of land and was, like the crops of the two previous years, very successful as regards outturn. This year the tobacco was raised without the aid of special manure and irrigation, which in a measure corroborates the opinion expressed last year

Growth of, without irrigation.

* Samples of the tobacco raised in this manner have been already forwarded for analysis.

that tobacco if planted early may be raised without irrigation, although something was no doubt due to the exceptional season experienced. There can be little doubt that, if it can be grown successfully under such conditions as this crop was raised, when tobacco is grown either for thè manufacture of cigars in this country or for export, it can be made one of the most profitable crops of the plains. Samples of this tobacco will when fit be submitted for analysis, if it be found to possess the objectionable characteristics noticed in that raised last year.

60. *Sugar-cane.*—A small plot (·87 acre) was planted with this crop on the 21st December 1879 and is doing fairly; the results will be given next year. One-half of the plot was planted with rows three feet apart and the other with the rows six feet apart; the former has so far done much better, and appears likely to give the best results, as the ground is much more thoroughly covered, and so evaporation is checked.

61. *Casuarina Trees.*—Those planted out in 1878-79 have progressed, for the most part, very favorably during the year under report, and are now nearly safe from the effects of a prolonged dry season. They cost comparatively little for watering, and will in a few years largely increase the value of the property; the land they have been planted on is not fit for any other purpose, and, as fruit and hardwood trees will be planted amongst them, it will become a permanent source of revenue instead of useless expense in keeping up appearances.

Growth on poor land.

During the season just concluded 92 acres of the remaining poor land were planted out, and up to the present the trees have done very well on the whole. They were planted on ridges raised with a plough only, alternate ridges being sown with dholl for shade, which method has turned out very satisfactorily. Besides the area above mentioned about 3·5 acres of land, which has for years been lying waste and unutilised in various corners of the farm, was successfully planted in the same manner. In the current year I hope that all the remaining pieces of waste land on the estate will be planted up, and also it is intended to plant a few acres of land which is of such inferior quality as not to be worth cultivation. When these operations have been completed it will be possible to utilise the annual expenditure to greater advantage on the more limited area of land of fair quality still remaining.

Utilization of waste land.

62. *Fodder crops* are referred to in Statement C of Appendix II; those mentioned do not comprise all that were raised, as a large area was under guinea-grass during the year, which was both grazed and in some cases cut over, and other crops still not harvested will be referred to next year. As already mentioned the season was peculiarly favorable for fodder crops. Large areas of horse-gram were also used as green manure, not being required for fodder. Fodder-growing for dairy purposes is no doubt one of the most profitable branches of husbandry in this locality, but, as long as the Commissariat Slaughter-yards remain on the Farm, the purchase of any number of cows would be unwise.

63. *The Irrigated Cereal* fodder crops call for no very particular remarks, except to point out the success obtained in growing cholum on our paddy land, which a few years ago could not have been done owing to the condition of the soil; and to notice crop No. 4, which in a great measure settles the question whether Chinese sugar-cane can be raised during our hot season; this crop is a most valuable fodder-producer, as the green stem is so much relished by cows, and because it exerts a beneficial influence on the flow of milk. None of the crops mentioned were irrigated more than occasionally.

64. *The Unirrigated Cereal* fodder crops nearly all gave a low outturn, but, as most of them were simply grain crops that had failed and were cut out green to make room for some other crop to follow, this is not surprising. With guinea-grass several very satisfactory cuttings were recorded, amongst them the following :—

No.	Field and Plot.	Area.	Date of Harvest.	Outturn per Acre.
		ACRES.		LB.
1	22-I ..	2·95	4th Oct. 1879.	4,136
2	23-II ..	1·50	1st Mar. 1880.	8,555
3	27-III ..	2·11	11th Oct. 1879.	9,923
4	29-III ..	1·00	15th Mar. 1880.	9,680

Of these Nos 2 and 4 were only put down during the past season, having been planted in October and December respectively, and the cutting recorded is the first obtained from them.

65. *The Leguminous* fodder crops recorded are most of them very satisfactory, and several heavy crops which remained uncut at the end of the year are not included. No 13 was raised on a field that has in a great measure been ruined by the original soil having been covered with the sand and clay removed in excavating the large irrigation channel which passes through the western end of the Experimental Farm. Horse-gram is the only crop that has succeeded at all on this field, and the outturn now recorded is very satisfactory. Nos. 15 and 16 were raised on the paddy beds referred to in paragraph 45 above and are very encouraging, as they show how much the condition of these fields has been improved of late years by thorough

and deep cultivation. Nos. 22 and 23 were both sown in alternate double lines with gingelly as described in paragraph 55 above, but, as the amount of seed that was on the plants was not worth threshing out, they were simply recorded as fodder crops; the outturn, 16,753 lb. per acre, from No. 22 is extraordinary and is the best ever obtained from this field, a part of which was drained (see paragraph 32).

66. *Miscellaneous Crops.*—Amongst these may be mentioned plantains, of which several small plots were growing or put down during the year, but concerning which there is nothing specially worthy of report. One plot was so severely damaged during the cyclone in May that it was considered advisable to remove the plants. In August 147 shoots of Manilla hemp (*Musa textilis*) were obtained from Captain Cox, of Wynaad, and planted amongst the plantain trees on a part of No. 4 field; since then they have done tolerably well. Only a few of them died after planting; these had been injured during transit. Those plants which were planted near the irrigation channel have grown most vigorously; these were about 10 feet high on the 1st of April, but it is yet too early to draw any conclusions from the experiment. The plants were treated like the common plantains as regards planting, watering, and hoeing.

67. An acre of land in No. 8 field was planted with brinjals (*Solanum Melongena*) on May 17th, and up to October 17th 1,435 lb. of fruit were obtained. The soil of the plot is a sandy loam in good manural condition; the crop grew very well at first, but at the time of flowering and during the whole time the plants were bearing it was attacked by insects, which checked the growth of the plants and reduced the yield As the fruit also was attacked, the produce had to be sold below the market price. The plants were, immediately after they commenced bearing, so much attacked by insects that the total loss of the crop seemed certain. Some cart-loads of ashes were then strewn over the plants, and they soon afterwards recovered. It is probable that the attack of the insects was due to the manuring given to the crop, and that newly-manured land was especially favorable for breeding them.

68. A small plot (·15 acre) was sown with coriander for the first time on the farm as an experimental crop. It followed New Orleans cotton. The soil is a sandy loam and received no special manuring: the seed was sown on ridges in the usual manner, but evidently from the result not thickly enough. The crop was not watered and gave an outturn at the rate of 413 lb. per acre, calculated at 1 anna per lb, which is below the market price; this would be worth Rupees 25-13-0 per acre, which, considering that the crop was only 82 days on the ground, is satisfactory.

MANURES.

69. During the past year the following manures were used on the farm:—Cattle box, sheep, and horse manure, refuse of the slaughter-yards, ashes, crushed bones, and lime.

Cattle-box manure.

70. The cattle-box manure is obtained from the farm cattle; they are generally kept in the boxes during the whole night and a few hours at noon. The excrements they drop in the boxes with the bedding supplied are allowed to accumulate for three or four months by which time the manure partly decomposes and is then carted at once to the fields. The manure accumulated during the hot weather is chiefly used for manuring of cold-weather crops, such as cotton, &c. The sheep manure was obtained from the farm sheep kept in covered pens and was chiefly used for top-dressing paddy crops. In several cases this manure had most remarkable effects on that crop; some crops that had suffered so much from the attacks of insects that it almost seemed advisable to plough them up were so much invigorated by a dressing of sheep manure that they gave a fair outturn. The horse manure was obtained from the Batteries stationed at St. Thomas' Mount at the rate of five cart-loads per rupee. The manure is valuable when well decomposed, but is of little use when fresh on account of its bulk and the living grass roots it contains. The cotton fields, Nos. 27 and 32, as well as several of the guinea-grass fields, were entirely manured with horse manure.

Sheep manure.

Horse manure.

Slaughter-house refuse.

71. The refuse of the slaughter-houses consists of the refuse obtained from the Commissariat yards mixed with ashes, and allowed to lie in pits for some months to become thoroughly deodorised. It was chiefly applied to fields that required a stimulating manure. The ashes were obtained from Saidápet at the rate of 1—2 annas per cart-load, a price which shows how little they are prized in this neighborhood. The ashes purchased were chiefly paddy-husk ashes and nearly free of sand, &c. Ashes are the cheapest manure available on this farm, and their use combined with green manuring is the simplest and most economical manner of getting our soil into good condition. Paddy-husk, containing a large percentage of valuable plant food, and especially phosphate of lime, must yield a most valuable manure for raising grain crops.

Ashes.

Crushed bones.

72. The crushed bones, being rather coarse, were nearly all put into the slaughter-house manure pit to decompose, as they would have been of little use for application in their coarse

state. Lime was used for indigo in one of the rotation and for several other fields; as it is rather expensive here, it is not extensively made use of; the lime needed for the crops can generally be applied much more cheaply in the form of ashes. Besides the manures mentioned above during the year 48·14 acres of horse-gram were raised and ploughed in as a green-manure. By this means the farm soils will be gradually improved and increase in value.

Lime.

Green manure.

73. Large sums of money have already been spent on manure both in the form of artificial food supplied to stock and in the purchase of manure, but still, owing to the original poverty of the soil and also from the extensive levelling operations which have been carried out, much remains to be done before many of the fields will be fit for regular cropping, and more particularly for experimental work, either in carrying on manuring experiments or in raising a variety of crops. By getting rid of the poorest land, which has been planted out with the only crop it is fit to produce, the expenditure with this object will be more usefully directed than it has been in former years. During the past year, including one-third of the cost of artificial food supplied to stock debitable to this heading, the total expenditure on manure was Rs. 1,086-13-4, besides the cost of raising the green-manure referred to above.

Necessity for heavy manuring.

74. As already explained the state of the soils of the farm is such as to preclude carrying out many manuring experiments of any particular value; the results of such experiments as have been made will, however, appear in the records, but no striking ones were obtained. Several experiments were commenced and are being proceeded with, which have for their object the demonstration of the inadvisability of burning cattle-dung for fuel; for, although it is plainly evident that the practice is a suicidal one, still there are those who under-estimate its pernicious effects, and the experiments as yet made have not been made under conditions such as would demonstrate the fact very clearly, although they have all tended to bear out the natural deduction from scientific reasoning.

LIVE-STOCK.

75. *The stock-breeding experiments*, which it was resolved in 1875 to proceed with, are still deferred chiefly because the Commissariat Slaughter-yards still remain on the farm, for it would be most unwise to keep valuable stock here as long as these yards remain where they now are, right in the middle of, and only accessible by passing over a considerable portion of the roads of, the farm. Last year* the fact that these yards being on the farm caused a great deal of trespass, and petty pilfering was brought to notice, and the necessity† for their removal has frequently been referred to in previous annual reports. This year the farm has suffered more severely than ever from their presence; there was an outbreak of foot-and-mouth disease (*Epizootic aptha*) amongst our sheep in October 1879 from which we lost 7 sheep and the whole flock was severely tried; following this we have had an outbreak of sheep-pox (*Variola ovina*) in February last from which up to the end of the year we had lost 15 sheep, when it was still present in our flock, and has since caused further deaths;‡ both these outbreaks can only be attributed to diseased sheep being driven through the farm on their way to the slaughter-yards, and so bringing in the infection, for our sheep are never allowed to go beyond the limits of the farm, which is also extremely isolated. Besides these losses I may mention that we have since the end of the year lost three bullocks, all employed at the slaughter-yards in removing the blood refuse for manure, from what was determined to be "rinderpest," and that the disease can only be traced to diseased cattle having been brought in for slaughter. It will thus be seen that the farm has experienced heavy direct losses from the presence of these yards, and the nuisance, trespass, and petty pilfering, &c., previously complained of still remains unabated. This being the case, the advisability of the removal of the yards is very evident.

Nuisance of slaughter-yards.

Losses from disease caused by presence of slaughter-yards.

Desirability of removing slaughter-yards.

76. *The cattle* during the year were generally very healthy; they were kept in the usual manner in loose boxes on the manure accumulated in the pits sunk therein. The foot-and-mouth disease, which attacked the sheep, did not spread to the cattle. The cows were kept in a separate shed, but not on the manure, it being removed daily, and the floor of the byres sanded.

* Paragraph 92 of the Report.
† Do. 94 do. for 1877-78.
Do. 87 do. for 1876-77.
Do. 46 do. for 1875-76.
‡ From April 1st up to June 28th 70 deaths occurred from this disease, and the constitutions of many more sheep have been ruined.

77. *The Aden Cow* referred to in paragraph 99 of last year's report continued to give milk until 17th May; she yielded as follows, bringing forward the record of last year:—

—	Quantity.		Value.		
	MRS.	OLLS.	RS.	A.	P.
From July 1878—March 1879	610	1½	101	11	2
April	70	2½	11	11	6
May, up to 17th	13	5	2	4	4
Total ..	694	1	115	11	0

The cost of producing this milk was as follows, no charge being made for the fodder supplied, the manure being taken as of equal value to it:—

		RS.	A.	P.
Brought forward from 1878-79		30	11	2
Charges in 1879 up to birth of next calf.	459 lb. of cake	9	0	2
	122 lb. of bran	2	7	0
	376 lb. of tour	2	10	11
	Attendance and sundries	5	8	0
	Total ...	50	5	3

At the end of this period there was a calf worth about Rupees 12, so that the cost of the milk produced was Rupees 38-5-3, or 11 pies per measure; it was sold at the rate of 2 annas 8 pies per measure.

This cow calved again on the 27th August 1879, and had up to March 31st yielded milk as follows:—

—	Quantity.		Value.			—	Quantity.		Value.		
	MRS.	OLLS.	RS.	A.	P.		MRS.	OLLS.	RS.	A.	P.
September	122	1¾	20	5	11	Brought forward	433	5¾	72	4	7
October	112	4	18	12	0	January 1880	104	2½	17	6	2
November	117	1½	19	8	6	February	82	2	13	11	4
December	81	6½	13	10	2	March	81	4½	13	9	6
Carried forward	433	5¾	72	4	7	Total ..	701	6¾	116	15	7

The cost of maintaining her during this period was—

	RS.	A.	P.
517 lb. ground-nut cake	9	11	8
525 lb. bran	10	8	0
90 lb. tour	0	10	3
Attendance and sundries	10	12	0
Total Rupees 4-8-3 per mensem, or ...	31	9	11

At the end of the year she was yielding milk at the rate of 2 measures 4½ ollocks per diem and is expected to calve again about the end of July. That this cow is a very good milker is evident from the following figures:—

	Amount.	
	MRS.	OLLS.
Calved May 1877, yielded milk for 48 weeks	832	3
Do. June 1878, milked from July 15th, 1878, to May 17th, 1879, yielded	694	1
Do. 27th August 1879, yielded milk in 7 months up to 31st March 1880	701	6¾

Desirability of importing fresh blood.

It is fortunate that we now have two heifer calves with which to perpetuate the breed, but it will be necessary to obtain some fresh blood from Aden, in order that we may not be obliged to cross them both at least. When the Commissariat slaughter-yards are removed it will be advisable to obtain another pure-bred bull and another full-grown cow, as the breed has shown itself to be a valuable one for the dairy, and as such useful for the improvement of the stock of this country.

78. *The Nellore Cow* referred to in paragraph 100 of the last report continued to yield milk throughout the year; the yield obtained from her up to March 31st last was as follows:—

—	Quantity.		Value.		
	MRS.	OLLS.	RS.	A.	P.
Received previous to March 31st, 1879	114	1½	19	0	6
,, April	75	6½	12	10	2
,, May	71	..	11	13	4
,, June	76	4	12	12	0
,, July	68	3	11	6	[illegible]
,, August	65	5½	10	15	[illegible]
,, September	74	6	12	[illegible]	[illegible]
,, October	62	6	10	7	4
,, November	52	2	8	11	4
,, December	36	2	6	0	[illegible]
,, January	43	7	7	5	[illegible]
,, February	35	4½	5	14	10
,, March	36	1	6	0	4
Total ..	813	1	135	8	4

She was yielding at the end of the year at the rate of 1 measure per diem, and her calf was then worth about Rupees 18; during the year she cost for maintenance, &c.—

	RS.	A.	P.
976 lb. ground-nut cake	15	6	3
647 lb. bran	12	15	0
466 lb. tour	3	5	3
Cost of attendance and sundries	12	4	0
Total ...	43	14	6
Charges incurred in 1879-80	6	2	2
Grand Total ...	50	0	8

so that the cost of the milk received was 7·6 pies per measure; she was not in calf at the end of the year.

79. *Punganúr Cattle.*—In November 1879, with a view to test accurately the milking capacities of this breed, which has a considerable reputation in this respect, three cows with young calves and a bull were purchased at Punganúr and brought to the farm; one cow was not received until 30th January 1880. They are all small animals, the cows averaging in weight 413 lb. They have been kept and fed like the two cows above referred to, which is something as follows:—

The cows are at 6 A.M. milked in the presence of the Storekeeper, after which they are allowed to graze until about 9 o'clock. From 9 A.M. until about 4 P.M. the cows are kept in the shed and are then again milked, after which they are brought to their byres for the night. The cows are fed twice a-day at milking time. They receive 6 lb of bran, 2 lb. of cake each with a little salt, and green fodder *ad libitum* per diem.

This breed appears to be very hardy, but the cows are rather wild; no European can safely go close to them. Their calves have all done very well. The bull has been used for light work in the cart and plough during the last few months of the year; but being of light make he will not be fit for heavy work, although he may become very useful in the harrow, bullock-hoe, and for other work where speed is required.

The yield of milk from the three cows is given below:—

—	Quantity.		Value.		
	MRS.	OLLS.	RS.	A.	P.
January, 2 cows	72	7½	12	2	6
February, 3 cows	92	0½	15	5	6
March, 3 cows	109	2½	18	3	6
Total ..	..	..	45	11	6

The cost of producing this milk was as follows:—

	RS.	A.	P.
182 lb. ground-nut cake	3	1	8
392 lb. bran	7	13	5
401 lb. tour	2	13	9
Attendance and sundries	6	14	0
Total ...	20	10	10

80. *The Sheep* flock suffered severely from disease during the year, especially in the latter part, as mentioned above; otherwise it progressed satisfactorily. The number of lambs born was 81 from 88 ewes placed with the rams: of the latter however 7 were barren and 2 dropped their lambs dead. The lambs suffered a great deal from their mothers having been attacked with foot-and-mouth disease during pregnancy, and many of them were small and weak, which caused a good many deaths during the last two months of the year. The following table shows the strength of the flock and death-rate for the past few years:—

—	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.
Average number of flock	207	221	237	275	295	274	251
Number of deaths	16	24	21	11	31	34	55
Percentage of deaths	7·73	10·9	8·9	4	10·5	13·14	21·9
Rainfall in inches	48·07	68·98	38·14	20·88	65·55	33·16	56·95

Between December and February 39 rams were distributed in the Mofussil, being despatched to the Collectors of the following districts:—

North Arcot	2	Chingleput	2
Kurnool	2	South Arcot	8
Salem	9	Trichinopoly	6
Coimbatore	4	Madura	6

A few more would have been sent out had not small-pox shown itself in the flock, and it is hoped that some more will be distributed during the current year. The animals sent out were not quite the best we have, as these were kept for breeding purposes; but they were decidedly better shaped and woolled than the ordinary sheep of the country, and it is hoped may produce some small effect where they are used.

81. *Pigs and Poultry.*—There is nothing particular to record regarding these descriptions of live stock; the former were healthy throughout the year, and a considerable number of eggs from the latter were disposed of to various people for setting in different localities.

82. In Appendix III of this report statements are given showing the stock maintained on the farm during each month of the year and the value of the artificial food supplied, and in the following table several details of interest regarding them for the past four years are shown:—

—	1876-77.	1877-78.	1878-79.	1879-80.
Live stock maintained, calculated as country cattle	132	135	123	125
Stock, as country cattle, per 100 acres of cultivable land ..	82·5	84·375	84·24	88
Percentage of deaths	7·6	12·9	8·9	8·8
	A. P.	A. P.	A. P.	A. P.
Cost of purchased food a head per mensem	8 6	10 6	14 5	12 1

A reference to the appendix will show that the sheep stock is the one on which the heaviest expenditure is incurred, and it has hitherto been in a great measure unremunerative, although much has been done towards the improvement of the breed, an object which merits considerable expenditure on the part of Government. Besides costing a large sum annually for artificial food, the sheep require a considerable expenditure on labor owing in a great measure to the necessity for keeping the rams, ewes, and young sheep separate, and hitherto the manure obtained from them has not been fully utilized, but now that the farm has been supplied with hurdles, it will be made better use of by folding the sheep in the fields.

IMPLEMENTS.

83. *The ploughs imported from Sweden* continue to give favorable results whenever deep ploughing is required and when the soil is rather dry. The single stilted plough has been mostly in use; it being of very simple construction and at the same time strong and effective is very well adapted for hard soil, especially as the draught required is moderate. During the past year a plough of this pattern was made up on the farm for Rupees 20, which is a very moderate price.

Cheaper Ploughs.

84. The light American pattern plough referred to in paragraph 110 of last year's report continues to give fairly satisfactory results. Several ploughs of this pattern slightly altered were made for Rupees 7-8-0, as well as some of the larger pattern with some alterations; the latter being simpler can be made much more cheaply than the original without loss of effectiveness; they have been made in the workshop for Rupees 10 without a wheel and for Rupees 12 with a wheel; the first mentioned plough (price Rupees 7-8-0) promises to be one of the best yet adapted to Indian conditions.

85. A plough was received during the year from Dr. J. Macgregor, Superintendent of Central Jail at Benares, which is built on quite a new plan; it has the advantage of being very light and short, and is in this respect especially suited to the wants of the native cultivator; it was tried several times on the farm, but, as the soil was rather hard each time, its working qualities could not be shown advantageously. The cost of this plough is Rupees 12.

A plough was also received from the Department of Agriculture and Commerce, N.W.P.; price Rupees 5-8-0; it is a modification of the American plough, and is light and easily transportable, but is less compact than the Benares plough, and, from the manner in which it is put together, will not admit of rough treatment. It has not as yet been tested in the field.

86. A number of the ploughs in common use on the farm were tested during the year to compare their effectiveness under certain conditions. The trial was made in the southern portion of field No. 29; the soil is a sandy loam and was in a very favorable state for ploughing at that time, so that the conditions were rather more advantageous to English ploughs than for those received from Sweden. If the soil had been drier, the good qualities of the Swedish ploughs would have been more clearly shown. At the same time two ploughs (Nos. 6 and 7 in the statement) imported by Messrs. Oakes and Co. from America were also tested, as well as the two American ploughs imported in 1875. The following table gives the results, the data for calculating the comparative efficiency being the amount of work done in a given distance and the draught required to move the ploughs:—

Description of Ploughs.	Furrow.		Cubic Yards of Soil moved in each 100 Yards run.	Draught.	Comparative Efficiency.
	Depth.	Width.			
	INCHES.	INCHES.		CWTS.	
1. Ransome's plough	4·8	10	3·7	1·75	100
2. Howard's do.	4·8	10·6	3·9	2	92
3. Single stilted Swedish plough, No. 29..	4·85	11·65	4·4	2·125	98
4. Swedish plough, No. 40..	5	9	3·5	2·2	75
5. Do. No. 34	5·17	9	3·6	1·725	99
6. Collins' plough, No. 106 (I. F.)	7·87	10·6	6·4	3·75	80
7. Do. No. 107 (do.)	7·35	9·9	5·6	5·05	52
8. American plough, Rs. 22	4·65	6·85	2·45	1·875	62
9. Do. do. „ 17	6	10·15	4·7	5·225	43

It will be noticed that the plough of Ransome's make heads the list; the only objection to this plough is that the stilts are so long that the ploughman is too far from his cattle, but this is in a measure counterbalanced by the greater control he has over the implement. The Swedish plough, No. 34, is a very useful implement and one of the best we have; it is, taking into consideration the superiority of its make, the best referred to in the statement. The single stilted plough has already been referred to, and is a very effective and handy implement. Plough No. 40 is one better adapted for use on hard or stiff soils than on soil in the condition that that in which these trials were made was. Both the Collins' ploughs were difficult to manage; both had a tendency to go downwards, and the plough marked No. 107 (I. F.) especially so. This being the case, the driver was unable to keep them steady and could not make a straight furrow. Although both ploughs are nearly alike, yet one required much greater draught than the other; on examining this plough it was found that the share pointed about one inch more to the landside than in the other, which most probably caused the greater draught. The ploughs are made of excellent material, but I am afraid that they cannot well be used in this country unless modified and supplied with a wheel, the draught required being too great for country cattle and the cultivators of this country not being skilled enough to work with the ploughs in their present state. The results obtained with the two American ploughs are not at all conclusive, as the ploughman using them was unaccustomed to their use and consequently they will need further trial.

Cheaper Harrow.

87. The wooden drag harrow hitherto in use on the farm has been found very effective in reducing clods on heavy and medium soil, but it requires a rather strong pair of cattle to drag it. In order to make this kind of harrow more suited to the native cultivator a lighter one was made up on the farm: the tines, instead of being fastened to the frame with bolts and nuts, were fastened with screws, whereby the cost was considerably reduced. A harrow of the original pattern cost Rupees 25, whereas the new pattern costs only Rupees 11.

Improved Sickles.

88. During the year a number of new reaping knives of an improved pattern were made. Previously the reaping knives were made in the shape of a half circle which did not admit their being used to advantage. The pattern now adopted is that of the sickle formerly in use in England which has a strong curve immediately above the handle, but straightened out towards the point. The cost of the old pattern knives was Rupees 1-8-0 a-piece and that of the new knives is 7 annas.

The hand seed-drill referred to in paragraph 114 of last year's report has been used during the past year in sowing blanks of cholum crops in several fields, and has been found to answer well for this purpose.

89. The double mhotes continue to give satisfactory results; the only drawback to them is that the repairs of the buckets, ropes, and neck-pieces are rather expensive. The same may be said of the bucket-pump, but its upkeep is more expensive than the mhote, because the repairs can only be made by a blacksmith, whereas most of the minor repairs of the mhote can be performed by any ordinary cooly.

MISCELLANEOUS.

90. *Estate.*—In April 1879 a piece of land belonging to the farm estate was transferred to the Commissiariat Department on which it is intended to erect the new slaughter-yards; it measures about 23 acres and is situated near the Mount Road toll-bar about half-a-mile from the farm. As already noticed a considerable area of land previously unutilized was planted up with trees during the year.

91. During the year but little was done for the improvement of the estate, except in completing works already commenced. The buildings were maintained in good order, the cattle-boxes being reroofed, and such repairs as were necessary executed. The large irrigation channel dug in 1877 on the western side of the farm was brought into communication with the river by building a tunnel under the main drive at the close of the year; this work, although useful at the time as a means of affording labor in the neighbourhood, must always remain a source of expense to the farm without adequate return; a proposal made by Mr. Robertson to extend the channel to some land which could be watered by raising the water from it only a small height was negatived by Government. The main drive was stoned and regravelled throughout the greater portion of its length, the depth of metal laid down when the road was made three years ago not having been sufficient. A useful stack staddle 20 feet square supported on cast-iron pillars with a wooden frame-work was put up during the year in the stack-yard, where it has already been found most useful, and sufficient sheep hurdles were manufactured to enable us to fold our sheep in the fields for manuring purposes; the latter were made with a frame-work of flat-iron, with rejected telegraph wire stretched for intermediate bars, and are light, strong, and portable. A few other minor improvements were carried out, but nothing to need mention here.

Irrigation Channel.

Stack Staddle.

Sheep Hurdles.

92. *Live Fences.*—The plant chiefly used for this purpose on the farm is the corkapilly (*Inga dulcis*); it is a useful plant which grows very rapidly and produces ornamental and tolerably effective roadside fences. It grows so rapidly however that it requires frequent cutting to keep fences of it in order, on this farm it being trimmed about three times a year; this is naturally a source of considerable expense where, as on this farm, appearances have to be considered much, but it is to a certain extent a valuable characteristic in a hedge-plant for this country in that by growing it a large supply of firewood may be easily and cheaply raised. There is, however, one very great objection to the plant for fencing purposes, and that is the manner in which, and the area of land over which, it throws out its roots. In making some excavations during the past year the roots of a fence not three years old were traced for a distance of 24 feet on the side, and near the fence the soil was full of roots. A plant that grows so rapidly must demand a good deal of the soil, and, as this one is so vigorous and being always present, it impoverishes the soil near where it is planted to such an extent as to render the growth of a good crop on the adjoining land an almost impossible achievement.

Advantages and disadvantages of corkapilly as a hedge-plant.

93. According to the orders of Government, in Appendix IV of this report abstract statements of account are given, which I trust will be found sufficiently detailed and instructive. The accounts given are incomplete as regards the allotment of charges; for instance, it is not possible to allot the charges under live-stock fairly, as, unless a much larger accounting establishment were maintained, it could not be done; credit has been taken in this account for one-third* of the value of the artificial food consumed, which sum was debited to "Manures," and the last-named account has been balanced by debiting all surplus expenditure against "Crops." No credit was taken under this head for cattle-labor supplied to crops. No valuation was attempted of unexhausted manures in the land, as we have no data for the purpose. Under labor estimated allotments have been made to crops (two-thirds), to live-stock (one-third), and to profit and loss (one-third) on account of expenditure on appearances. Under implements no credit could be taken for work performed on account of tillage operations, but the loss shown is in a great measure due to the depreciation of large numbers of useless machines transferred to the farm from time to time. No credit was taken under crops for fodder and grazing supplied to stock, it being considered as equal in value to the

Manner in which the accounts have been worked out.

* This is probably too high a valuation, but having been taken in previous years is adhered to.

manure returned. Labor, in cattle, &c., supplied to the School of Agriculture, Botanical Grounds, was not credited, but I hope will be during the current year, nor was any account taken of the manure supplied to, and produce received from, those grounds. The accounts however show generally the position of the farm financially, which has been asked for by Government.

Small value of the accounts as they are.

94. There are many causes which render accounts such as these of no practical value, most of which have been explained at different times; if it be desired that absolutely accurate accounts should be kept and that the expenditure should be properly allotted under various headings, so as to bring out clearly the sources of profit or loss, the officer in charge of the farm will have to devote far more time than he should, in justice to his field-duties, to deskwork, and an increased accounting establishment must be provided. Such a state of things is highly undesirable, as already office-work takes up too much time. The cost of obtaining a complete series of accounts would far outweigh any possible practical value that can be attached to them. If Government desire the farm to be a financial success, a totally different system must be adopted; that is, as regards the objects held in view, and then, notwithstanding the unfavorable circumstances under which the farm is situated, it may be attained.

95. *The general system of management* of the farm has been that laid down by Government in their Order, No. 1657, dated 22nd September 1871, modified by the resolution to carry on some stock-breeding experiments on it and to suit the requirements of an educational farm as far as possible. For these purposes the land lying south of the Mylapore Tank waste water channel has been conveniently laid out and will be worked for purely experimental purposes as soon as it has been brought into a suitable state, whilst a considerable area north of the channel has been laid down in guinea-grass for grazing purposes, whilst such portions of the farm as are of so inferior quality as to be only cultivable at a certain loss have been, and are being, planted out with fruit and fuel trees, for which only they are adapted.

96. I propose during the current year to set apart and work practically by itself the extreme northern portion of the farm comprising fields Nos. 29—37 inclusive and to maintain a special account of the expenditure and income therefrom; this land, though so badly situated for a commercial farm that I was obliged to report* against its being used for one, is the only portion of the estate that can be used at all for such objects, and in a modified manner it is intended to work this land as far as possible on commercial principles, but there are, as explained in paragraph 14 of this report, many causes which, setting aside the unfavorable situation of this land in particular, may prevent the work from showing a good return. I, however, hope that this may in some measure meet the views of Government in the matter.

97. Mr. Schiffmayer had charge of the details of the work connected with the farm throughout the year, and to him must be attributed such success as was attained in the growth of crops, management of stock, &c.

Regarding the subordinate establishment there is nothing to remark.

98. Holding office only as a *locum tenens*, it has been my object as far as possible to adhere to the plans which I know Mr. Robertson had in view regarding the general direction of the work of the farm. Owing to circumstances which have been detailed in previous reports, it has been impossible to do much experimental work in the field, and attention has been chiefly directed towards the amelioration of the soils of the farm, which in many cases, owing to the extensive levelling operations previously carried out, are now of most uneven quality. They naturally possess very little fertility, and are many of them in poor condition; both time and labor will be required to bring them into such a state as will admit of our engaging extensively in experimental work of scientific and practical value, but, as soon as the fields are considered to be in a suitable state, they will be devoted to such purposes. To render such work of any considerable value the aid of an Agricultural Chemist will be imperative; the services of one are also required to put the work of the School of Agriculture on a proper footing.

IMPLEMENT WORKSHOPS.

Object of the Workshops.

99. These shops have been a sub-division of the work carried on on the Saidápet Farm, and their object has been to supply a widely-spread want by manufacturing improved implements and tools, such as can be made use of in this country, for sale at cost price. One of the main objects of our work being the introduction and adaptation of improved implements, such an establishment is necessary. The shops were started at the beginning of 1871, but Government during the past year ordered that they should be closed, as "a manufactory for making inferior machines at Government cost is not desirable." Our experience has been that the implements, &c., made have satisfied our wants, and by a glance at the balance sheet it will be seen that these shops have cost Government during nine years the sum of Rs. 461-4-8, or about Rs. 50 per annum. During this time they have been a means of saving a large sum of money to the

* See letter, No. 885, dated 22nd July 1879, printed with Board's Proceedings, No. 4269, dated 19th September 1879.

farm in the manner pointed out in the Farm Report for 1871-72, and through them the following implements, machines, &c., have been distributed to the public :—

Iron Ploughs.	American Pattern Ploughs.	Combined Ploughs.	Bullock Hoes.	Planter's Hoes.	Wheel Hoes.	Harrows of sorts.	Seed Barrow.	Carts.	Reaping Knives.	Scythes.
54	31	65	15	15	8	15	1	5	454	36

* * * * *

100. It will be necessary for us to maintain a smithery, &c., for the execution of repairs and other works for the Saidápet Farm, and I trust that Government will not object to our meeting, as far as we can, requests for the supply of such implements as we can spare.

101. In Appendix IV of this report the accounts of the shops are given.

MISCELLANEOUS WORK OF THE DEPARTMENT.

102. *Introduction and Distribution of Seeds, &c.*—Owing to the uncertainty caused by the orders of Government whether seeds should be distributed gratis or no, but little was done in this direction during the year. Towards the end of it, however, Government decided to continue the gratuitous distribution of new staples, &c., to persons interested in their introduction. The following table shows the amount of seeds sent out during the year and the districts to which they were despatched :—

Districts.	Planter's Friend.	Sorghum Saccharatum.	Cotton. Seed.	Castor Beans.	Maize.	Miscellaneous. Seeds.	Models of Double Mhote.
	LB.	LB.	LB.	LB.	LB.	LB.	
1. Madras	..	..	20	20	1	..	3
2. Chingleput	3	8½	1½	..	101¼	2¾	..
3. North Arcot	50	50	..	..	..	..	..
4. South Arcot	40	40	20	..	..	..	..
5. Salem	105	150	6	..	..	4½	..
6. Trichinopoly	30	50	50	..	..	..	..
7. Coimbatore	152	210	..	..	..	20	..
8. Tanjore	..	10	..	..	..	..	..
9. Madura	50	50	..	..	..	..	..
10. Tinnevelly	100	100	..	..	..	..	..
11. Cochin	..	20	..	20	..	..	..
12. Malabar	10	10	..	..	0½	..	..
13. North Canara	125	125	..	..	..	..	..
14. Nílgiris	15	15	..	..	..	..	..
15. Bangalore	30	30	..	..	2	..	..
16. Wynaad	10	10	..	..	..	..	..
17. Bombay	2½	3½	6	2½	0½	37¾	1
18. Dharwar	20	20	..	..	..	..	..
19. Java	0½	0½	0¾	..	0½	1½	..
20. Brisbane	..	..	..	..	..	1	..
21. Sundry persons	..	2	2	..	..	..	..
Total ..	743	904¼	106¼	42½	105¾	67½	4

103. *Agricultural Exhibitions.*—None were held during the year, and up to the 1st of April no orders had been received regarding a suggestion that one should be held early in 1881; the Board of Revenue, however, had expressed an opinion that the country had still not sufficiently recovered from the effects of the famine to render it advisable to hold one then, and now it does not seem likely that one will be held.

104. On a suggestion of mine that good might be done by exhibiting some improved ploughs at work to the ryots, I despatched a party consisting of an Agricultural Instructor and two ploughmen to Trichinopoly in July. In forwarding the Instructor's report of his work to the Collector, I observed—

"The late date at which the sanction for this work was received was unfortunate for several reasons. At the time the class of students from whom I wished to select an Instructor was dispersed, and so I was not able to obtain the services of any of the best of them. The cultivating season of your district was also far advanced, and this has militated against the results of the work done.

"Of the actual results, as far as demonstrating to the ryots the superior efficiency and cheapness of these ploughs, you will be able to judge best from the reports of your Revenue

officers, and I should be glad to learn what they report in this respect, as it will afford us information to guide us in future.

"The chief objections which the Instructor reports as being made by the ryots are—

(1) The high prime cost of the ploughs.

(2) The value of the cattle required.

(3) The draught of the implements.

(4) The danger of their rent being raised if, by improved cultivation, they produced larger crops.

"The only one of these objections which I think is likely to be a permanent obstacle is the first, and that I hope to be able to overcome by modifications of the plough so as to reduce its cost. We have already produced a fairly efficient plough for *light soil* at a cost of less than Rs. 10, and I do not despair of reducing its cost to Rs. 7.

"The extra risk of keeping more valuable cattle is an objection which I do not think will last. Such extra risk is accepted by the ryots of the Northern Districts, such as Cuddapah and Nellore, and, if stronger cattle are used, the draught of the improved ploughs will be well within their power. I saw during my tour in Trichinopoly many pairs of cattle quite competent to draw these ploughs, and they appear to have been forthcoming during the Instructor's tour on some occasions.

"The last of the objections raised by the ryots is one which must be met with in all endeavors for agricultural improvement, and can only be overcome by confirmed assurance on the part of Government to the effect that the anticipated danger is not real.

"It is incorrect, I believe, to look to the improved plough as a certain means of increasing the outturn of the crops raised. Their value lies chiefly in their superior cheapness, and efficiency in cultivating operations, and the protection obtained, by the deeper cultivation they effect, against the effects of failures of rainfall and also of excessive rainfall. Of course in many cases the deeper cultivation attained will cause a larger production. But again, in such cases as when a sour unaërated subsoil is turned up, deep ploughing may be absolutely harmful and deep cultivation needs to be carried out in such cases with great care, although its ultimate results must be beneficial.

Results unsatisfactory.

105. As far as I am aware, the Collector had not up to the end of the year sent in any report on the work to the Board, but I cannot regard the results as otherwise than unsatisfactory, chiefly on account of the inefficiency and want of experience on the part of the Instructor sent, who however was the only man at all likely to be able to perform the work whom I could obtain, and also from the late season at which the ploughs were sent, caused by the delays which occurred in coming to a decision on the matter. I believe that great good may be done by similar exhibitions, but it is almost useless to hold them as long as no means are available for supplying such ryots with improved ploughs as would like to obtain them. As I have already pointed out, Government have stopped all manufacture for sale by this department, and as yet no other means of meeting such demands have come into existence—a regular sustained demand not having arisen.

106. The annual ploughing match was held on December 19th, 1879, and was very successful. It excited a good deal of attention, especially in the case of the class in which students in the School of Agriculture were alone allowed to compete. A separate report on it was submitted and published as a supplement to the *Fort St. George Gazette* of 3rd February 1880, so it needs no further reference here.

107. *The Correspondence* with the Board of Revenue and other official bodies and with the general public on matters of agricultural interest was larger than usual during the year, but I may remark that fewer questions were referred by the Board and Government for opinion than usual, the reason for which I am not able to explain. I do not think it necessary to give lists of the chief subjects on which correspondence took place, such as have been published for the last few years, for the lists already printed are sufficient to show the general nature of our work in this direction.

108. *Publications.*—The Saidápet Farm Manual referred to at page 135 of last year's report was issued to the public in July, but although Government had sanctioned a copy being supplied to every English-speaking Tahsildar, Deputy Tahsildar, and Revenue Inspector, this was not done, as the Board of Revenue refused to sanction a sufficient number of copies being struck off, so that only a portion of the officers named received a copy. This is greatly to be regretted, as, by giving the officers named a means of obtaining some, even if it be very little, sound information on agricultural matters, a great step forward would have been made. These officers, whose main duties are the management of the landed estates of Government, are not at present required to show any acquaintance with the first principles of rational agriculture—a state of things which might easily be obviated by insisting on their acquiring the knowledge they are deficient in before they become eligible for the posts they hold.

Value of agricultural information to Revenue Officers.

Agricultural Primer prepared.

109. A small Primer for the use of the Upper Primary and Middle Class Schools in the Presidency passed through the Press during the year. It was prepared by Mr. Robertson and its publication was greatly delayed by that officer's absence on furlough. It has been made the text-book in the Middle School Examination.

Issue of records.

110. Provided that sufficient matter is available, sanction has been given for the issue in future of a half-yearly volume of records of the work of the department. This will be in a more convenient form than that adopted for the annual report, and thus it is hoped will meet with greater favor and more attention, as every one must admit that the foolscap form of publication is both cumbrous and repelling to the reader. With these records will be issued, when available, papers of interest on agricultural topics, and thus I trust they will become a valuable means of diffusing agricultural information in the country.

General inaccuracy of returns.

111. *Our Agricultural Statistics*, every one must admit, are in a very unsatisfactory state, having regard to the manner in which they are prepared, and to the small importance which has until recently been attached to them; this holds good both as regards the statistics of live-stock as well as those of the areas under various crops. The only portion of them which is at all accurate is that relating to the total areas under cultivation and occupation, which clearly show how rapidly the area of available arable land is being brought under cultivation, and, when it is remembered that the land, still remaining untouched by the plough, is for the most part of very inferior quality, this fact points to the necessity for urging on efforts for the improvement of the husbandry of the Presidency in order that the land may be able to meet the demands for food and clothing which a rapidly increasing population must cause.

112. In September last, I submitted a letter to the Board of Revenue showing that, according to the statistics of live-stock, then recently published, for the period ending July 1877, by the drought and other causes the stock of the country had been reduced to almost the same number as it stood at 20 years before, as shown by the following figures in which the districts of Malabar and South Canara are excluded :—

—	1856-57, Fasli 1266.	1871-72, Fasli 1281.	1876-77, Fasli 1286.	Increase or Decrease for fifteen Years ending 1872.		Increase or Decrease for twenty Years ending 1877.	
				Total.	Percentage.	Total.	Percentage.
Tilling Cattle	2,780,385	3,563,201	3,281,396	+ 782,816	+ 28·2	+ 501,011	+ 18·0
Cows and She buffaloes ..	3,894,068	3,363,561	3,098,102	— 530,507	— 13·6	— 795,966	— 20·4
Sheep	6,070,651	6,696,609	6,119,890	+ 625,958	+ 10·3	+ 49,239	+ ·8
Total live-stock as Cattle ..	7,888,583	8,266,084	7,603,476	+ 377,501	+ 4·8	— 285,107	— 3·6

113. Regarding the figures, I remarked amongst other things that they showed a terrible loss of life amongst the live-stock even up to the date at which they were compiled; and I estimated the loss at about $1\frac{1}{2}$ million cattle and 2 million sheep during the last five years of the period after making allowance for the births in five years, and calculated the total loss at about Rs. 2,00,00,000, and added—

"This estimate, it must be remembered, does not refer to the whole period of the famine, nor does it allow for the terrible after-effects of the scarcity in the deficiency of young stock. Want of food naturally checks the breeding of stock, and so for several seasons there can have been but few young stock raised to replace the losses. These last facts strongly point to the necessity for improving the farming of the country."

In disposing of my letter, in which I said, regarding the statistics,—

"It is not to be expected that these statistics are correct, as they are subject to no kind of check, but their inaccuracies probably balance each other at the different periods to which they refer, and so for the sake of comparison they will suffice. It may be urged that the statistics are not reliable enough to base any calculations on, but if that be the case they are worthless, and their compilation only involves a waste of time and leads to misconceptions. That there are great doubts as to the reliability of the statistics, I think I conclusively showed in paragraph 133 *et. seq.* of my Trichinopoly Tour Report, although I believe they are sufficiently accurate for comparative purposes."

The Board of Revenue remarked—

"The later figures are probably more accurate than the earlier, but until a careful census of cattle and sheep is taken nothing reliable can be deduced from them."

And added that—

"During the famine years the mortality was no doubt severe, and the Board can readily believe that correct figures would show a marked decrease in the number both of cattle and of sheep. As regards cattle, much of the loss must have been of old and useless animals, which would not have been allowed to cumber the land in any other country. As to sheep, immense numbers were killed and eaten by hunger-stricken thieves, and much larger numbers than usual must have been disposed of in supplying the markets of the famine districts. If these are added to the numbers destroyed by want of food, the figures will not warrant the conclusion that the cattle of Southern India are gradually perishing off the face of the earth, or that the country is being slowly but surely reduced to a desert."

In a further letter on the subject I suggested the advisability of taking a careful census of the cattle and sheep of the Presidency, and urged that, if we once obtained accurate figures as to the number of live-stock, it would be comparatively easy to check the returns in future. The Board, and Government agreed with them, were strongly opposed to numbering the live-stock, chiefly on account of the labor of the work and the likelihood of the measure giving rise to distrust and apprehension of increased taxation; and urged the Collectors to endeavor to attain greater accuracy in preparing future returns. * * *

114. *Prevention of Cattle Disease.*—Between four and five hundred rupees were spent in the Nílgiri District for this purpose during the year, but I have no information regarding the manner in which it was spent.

115. The following publications were received in exchange for those of this department during the year:—

Proceedings of the Horticultural Society, Madras.
Journal of the Horticultural Society of India, Calcutta, 1879.
Report of the Department of Agriculture and Commerce, N.-W. Provinces and Oudh.
Report on the Government Experimental Farm, Khandeish.
Report on the Nagpore Experimental Farm.
Records of the Geological Survey of India.
Journal of the Royal Agricultural Society of England, London.
Journal of the Society of Arts, London.
Journal of the Highland and Agricultural Society of Scotland, Edinburgh.
Journal of the Royal Society, Edinburgh.
Report on the Botanical Gardens, Brisbane.
Do. do. Buitenzorg, Java.
Do. do. Ceylon.
Do. do. Adelaide.
Do. do. Melbourne.
Reports of the Commissioner of Agriculture, United States, America, 1877 and 1878.
Italian Statistical Reports.
Report on the Cultivation of Carob beans in Italy.

116. *Finances.*—The following abstract statement shows the income of the department and the expenditure on various objects during the year; details are given in Appendix VI:—

	RS.	A.	P.	RS.	A.	P.	*Expenditure.*	RS.	A.	P
Balance on the 1st April 1879 ..	..			2,29,786	0	2				
Receipts.							General Supervision	15,577	10	1
							Saidápet Experimental Farm ..	9,835	2	3
							Implement Workshops	938	9	2
Provincial Grant	20,000	0	0				School of Agriculture	28,798	0	5
Surplus Pound Fund	44,218	15	7				Estate Improvements	3,498	13	2
Saidápet Experimental Farm ..	2,975	10	6				Compensation for killing diseased cattle in the Nílgiri District ..	456	10	2
Implement Workshops	1,236	5	4							
				68,430	15	5	Balance in favor of the department on the 1st April 1880	2,39,112	9	8
				298,216	15	7		2,98,216	15	7

117. After a few weeks' privilege leave in April, I received charge of the department from Mr. Robertson early in May when he proceeded on furlough for 19 months, and remained in that position throughout the year. The Saidápet Experimental Farm was under Mr. Schiffmayer's charge the whole year, excepting during a month that he was absent on leave in July, when, for the first time in over five years, all the work of the department devolved on one officer. The subordinate establishment gave general satisfaction during the year.

SAIDAPET, (Signed) CHARLES BENSON, M.R.A.C.,
28th May 1880. Ag. Superintendent, Government Farms, Madras.

APPENDICES.

APPENDIX I.

STATEMENT showing the Monthly Rainfall compared with the Average of the previous Ten Years.

Months.	1879-80.		Average of 10 Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
April 1879	..	..	·39	·7
May "	3·99	3	4·14	2·0
June "	1·81	11	2·69	5·3
July "	1·33	10	3·91	8·6
August "	7·24	15	4·76	8·6
September "	1·27	4	6·07	8·7
October "	19·13	17	10·42	10·6
November "	11·87	11	12·78	12·0
December "	5·51	7	3·67	5·2
January 1880	2·30	3	·67	1·2
February "	2·50	1	·89	·7
March "	..	..	·35	·7
Total ..	56·95	82	50·74	64·3

Statement showing the Weekly Rainfall for 1879-80 with the Average of the previous Ten Years.

Weeks.	1879-80.		Average of the previous 10 Years.		Weeks.	1879-80.		Average of the previous 10 Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.		Rainfall.	Wet Days.	Rainfall.	Wet Days.
1st Week ..	..	..	·22	·2	27th Week ..	7·52	4	1·68	2·5
2nd do. ..	..	..	·01	·1	28th do. ..	2·63	3	1·40	1·7
3rd do. ..	..	..	·06	·2	29th do. ..	1·95	3	3·26	2·8
4th do. ..	..	..	·01	·1	30th do. ..	3·68	4	3·08	2·8
5th do. ..	..	..	1·42	·6	31st do. ..	3·78	6	1·96	2·2
6th do. ..	..	..	·11	·3	32nd do. ..	2·66	3	2·32	2·2
7th do. ..	..	..	1·61	·6	33rd do. ..	4·78	3	3·94	4·0
8th do. ..	3·99	3	·92	·3	34th do. ..	3·30	1	2·82	3·3
9th do. ..	..	..	·13	·3	35th do. ..	·70	1	3·28	2·5
10th do. ..	·58	4	·61	·7	36th do. ..	1·26	2	2·11	1·6
11th do. ..	·50	1	1·07	1·3	37th do. ..	..	..	1·02	1·8
12th do. ..	·05	1	·34	1·1	38th do. ..	·45	3	·46	1·0
13th do. ..	·54	5	·43	1·6	39th do. ..	3·80	2	·05	·6
14th do. ..	·19	2	·49	1·2	40th do. ..	..	..	·02	·3
15th do. ..	·02	1	·93	1·6	41st do. ..	..	..	..	..
16th do. ..	·53	3	.89	2·3	42nd do. ..	..	..	·52	·7
17th do. ..	·22	3	·74	2·1	43rd do. ..	·45	1	·14	·4
18th do. ..	·74	4	1·41	2·2	44th do. ..	1·85	2	..	..
19th do. ..	·02	1	1·31	2·6	45th do. ..	..	..	·69	·5
20th do. ..	2·77	4	1·15	1·8	46th do. ..	..	..	..	..
21st do. ..	·35	4	·84	1·8	47th do. ..	2·50	1	·12	·1
22nd do. ..	3·94	5	·96	1·6	48th do. ..	..	..	·06	·1
23rd do. ..	·70	2	1·82	2·7	49th do. ..	..	..	·15	·4
24th do. ..	·50	1	1·22	2·0	50th do. ..	..	..	..	..
25th do. ..	..	..	1·59	1·7	51st do. ..	..	..	·15	·2
26th do. ..	..	..	1·10	1·8	52nd do. ..	..	..	·05	·1

APPENDIX II-A.

STATEMENT showing the Arrears cropped with and Yield of Food-grains obtained on the Saidápet Farm during the year 1879-80.

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing. Date of	Sowing. Seed Sown. Total.	Sowing. Seed Sown. Per Acre.	Details of Harvesting. Date of	Outturn. Grain.	Outturn. Straw.	Outturn. Grain per Acre.	Outturn. Straw per Acre.	Duration of Growth.	Rainfall. Inches.	Rainfall. Wet Days.	Remarks.
	Unirrigated Cereals.		ACRES.	D. M. Y.	LB.	LB.	D. M. Y.	LB.	LB.	LB.	LB.	DAYS.			
1	Cumbu	34 I ..	1·88	24 5 79	23	12	28 7 79	302	10,164	161	5,406	65	2·53	18	Soil, sandy loam, in fair condition. Followed yellow cholum fodder crop. Yield, grain low, straw good, for so short a period.
2	Do.	18 ..	2·29	22 5 79	40	17	9 8 79	140	4,940	61	2,157	79	3·44	25	
3	Do.	31 ..	1·80	11 6 79	26	14	26 8 79	466·5	9,596	259	5,331	76	5·43	27	
4	Do.	30 II ..	1·97	11 6 79	28	14	30 8 79	332	6,460	168	3,277	80	9·30	31	Soil, in bad state, containing much salt; never previously produced a fair crop, except ragi.
5	Do.	25 ..	1·91	11 6 79	20	10	30 8 79	101	3,240	53	1,696	80	9·30	31	
6	Do.	28 ..	·51	10 6 79	8	15	8 9 79	49	2,456	96	4,815	89	10·07	34	
7	Yellow cholum	11 ..	1·48	22 8 79	100	67	29 12 79	1,245	21,168	851	1,433	129	41·98	46	
8	Do.	14 ..	3·47	13 9 79	70	21	8 1 80	675	14,892	195	4,291	117	56·51	35	
9	Do.	8 ..	2·62	20 12 79	75	28	14 4 80	1,433	14,560	547	5,557	116	8·62	7	
10	Black cholum	32 ..	2·38	3 9 79	45	18	5 1 80	3,010	21,110	1,265	8,869	124	37·71	38	Soil, sandy loam, of even quality. Followed horse-gram cut for fodder. Yield extremely good. Cotton sown with crop.
11	Ragi	18 ..	2·29	7 10 79	43	18	13 1 80	1,589	1,557	693	680	98	28·99	31	Ragi good as regards grain. Planter's Friend remarkable for yield of the succulent straw.
12	Planter's Friend	1 ..	1·19	1 9 79	23	19	7 1 80	700	14,308	588	12,023	129	37·78	39	
13	Do.	27 II ..	1·07	26 8 79	30	28	20 2 80	534	8,762	499	8,189	178	46·51	48	One of the worst soils on the farm. Yield fair considering the conditions. Cotton sown with crop doing fairly.
	Irrigated Cereals.														
14	Carolina paddy	37 I ..	·62	8 2 79	Planted.		6 6 79	62	1,064	100	1,716	118	6·22	9	Soil, sandy loam, fair quality, and tolerably well drained; greatest care taken with crops, but the results are all extremely unsatisfactory.
15	Do.	35 I ..	·31	11 7 79	Do.		13 10 79	75	735	24	2,371	94	19·92	34	
16	Do.	36 III ..	1·00	14 10 79	Do.		12 2 80	63	2,493	63	2,493	121	28·66	31	
17	Madagascar paddy ..	37 I ..	·31	19 7 79	Do.		22 11 79	58	780	187	2,516	136	39·54	51	Followed No. 14. Summer crop poor.
18	Do. ..	37 I a ..	·12	25 10 79	3	25	31 3 80	163	1,741	1,358	14,508	158	25·61	26	Followed No. 14. Cold-weather crop very good.
19	Do. ..	35 II ..	·61	27 11 79	20	32	31 3 80	346	3,686	567	6,042	125	11·01	12	On same plot as crop raised last year. Outturn fair.
20	White car paddy	35 III ..	·57	31 10 79	20	35	15 3 80	279	2,185	490	3,833	136	23·23	23	Soil very inferior and situated as No. 19.
21	Do.	35 IV & V	1·14	29 11 79	60	53	24 3 80	1,960	5,880	1,719	5,158	116	11·01	12	Soil fair, but badly situated. Outturn very good.
22	Car paddy	35 I ..	·31	27 11 79	25	80	11 3 80	520	1,608	1,677	5,187	105	10·38	12	

23	Do.	37 I b..	·50	6 2 80	Planted.		13 4 80	666	2,022	1,332	4,044	67	2·52	2	Soil previously in a very bad state; has lately been much improved. Field is well situated for irrigation, but liable to flood. A double crop was obtained on part of the field.
24	Do.	37 II ..	·45	31 12 79	Do.		29 3 80	624	2,966	1,387	5,924	90	4·80	4	
25	Do.	37 III..	·50	22 10 79	Do.		30 1 80	560	2,564	1,120	5,128	100	25·16	27	
26	Do.			6 2 80			3 5 80	291	1,725	582	3,450	88	2·52	2	
27	Do.	37 IV ..	·54	21 10 79	Do.		31 3 80	360	3,440	666	6,370	102	27·26	27	
28	Do.			3 2 80			3 5 80	317	2,047	587	3,791	91	2·52	2	
29	Do.	37 V ..	·60	21 10 79	Dc.		1 1 80	323	3,037	538	5,062	72	24·96	26	
30	Do.			31 1 80			30 4 80	424	1,928	707	3,213	91	2·52	2	
31	Do.	36 I ..	1·58	21 10 79	Do.		23 1 80	220	2,471	139	1,564	94	25·41	27	Soil in a bad state caused by stripping surface some years ago; drainage also bad, and out-turn consequently low.
32	Sumba paddy (60 days)..	36 I b..	1·33	29 1 80	80	50	20 4 80	451	1,913	338	1,438	82	3·37	4	
33	Car paddy	36 II ..	·37	28 11 79	Planted.		10 4 80	405	2,059	1,095	5,565	134	11·03	13	Soil in fair condition.
34	Do.	R.F. II ..	·81	26 3 79	30	37	25 7 79	510	8,205	629	10,129	121	6·52	22	Land in river bed, south of farm buildings, situated nearly at river level; crop raised in 1879.
35	Do.	R.F. IV..	·62	17 3 79	30	48	2 8 79	577	7,788	930	12,767	138	9·18	27	
36	Do.	R.F. VI..	·21	11 2 79	27	128	3 6 79	55	266	262	1,267	112	6·19	7	
37	Do.	R.F. I ..	·81	6 1 80	Planted.		24 4 80	710	2,973	876	3,670	109	4 80	4	Raised on portions of the same land as the above in 1880.
38	Do.	R.F. II ..	·61	15 1 80	Do.		23 4 80	900	2,846	1,475	4,666	99	4·80	4	
39	Do.	R.F. IV..	·79	20 1 80	Do.		24 5 80	1,280	4,744	1,620	6,005	125	4·82	5	
40	Do.	R.F. V ..	·79	6 2 80	Do.		3 5 80	1,064	940	1,347	1,189	88	2·52	2	
41	Ragi	30 ..	1·00	10 11 79	20	20	28 1 80	347	2,333	347	2,333	79	14·74	13	Followed crop No. 4 on portion of field. Yield fair considering the soil.
42	Maize	8 ..	·25	14 6 79	10	40	13 9 79	85½	4,320	342	17,280	91	10·57	35	Raised in same field as crop No. 9; cobs very small, though numerous.
	Unirrigated Pulses.														
43	Green-gram	34 I ..	·39	29 12 79	18	46	27 3 80	43	1,349	110	3,459	94	4·80	4	Soils in nearly all cases similar and in fair condition, being a well drained sandy loam.
44	Do.	34 II ..	·72	22 12 79	35	48	17 3 80	209	1,691	290	2,348	86	8·60	6	
45	Do.	33 ..	1·77	27 12 79	50½	29	24 3 80	490	3,542	277	2,001	88	4·80	4	
46	Do.	15 ..	2·15	31 12 79	80	37	15 4 80	108	2,804	50	1,304	106	4·80	4	
47	Black-gram	19 ..	1·39	20 12 79	59	42	8 4 80	94	1,582	67	1,138	110	8·60	6	Soil very inferior, a coarse sand in poor condition.

APPENDIX II-B.

STATEMENT showing the Industrial Crops harvested on the Saidápet Farms during the Year 1879-80.

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing. Date of	Sowing. Seed Sown. Total.	Sowing. Seed Sown. Per Acre.	Details of Harvesting. Date of	Details of Harvesting. Outturn. Total.	Details of Harvesting. Outturn. Per Acre.	Duration of Growth.	Rainfall. Inches.	Rainfall. Wet Days.	Remarks.
	Cotton.							Seed-Cotton.					
			ACRES.	D. M. Y.	LB.	LB.	D. M. Y.	LB.	LB.	DAYS.			
1	New Orleans	1	1·00	26 9 78	7	7	31 7 79	365¾	365¾	308	20·58	54	See paragraph 52 of last report. Yielded 348¼ lb. of lint = 31·7 per cent.
2	Do.	3	1·78	28 9 78	20	11	Do.	733½	412	306	20·33	53	
3	Do.	4 II ..	3·18	12 9 78	25	8	10 7 79	1,810¼	569	301	20·24	51	See paragraph 91 of last report. Yielded 574½ lb. of lint = 31·7 per cent.
	Oil Seeds.							Seed.					
								LB.	LB.				
4	Castor beans	26 II ..	1·22	2 12 78	25	20	9 7 79	53⅓	44	219	9·14	29	Raised amongst casuarina trees for shade, but owing to extreme drought did badly.
5	Do.	24 II ..	1·20	11 12 78	31	26	20 6 79	152½	127	191	9·29	19	
6	Do.	12 I and II.	·40	28 12 78	Sorts.		2 8 79	324½	811	217	9·90	31	This was of several varieties raised from Italian seeds.
7	Gingelly	10	4·25	1 5 79	80	19	9 8 79	321	75	81	7·34	26	Soil, sandy loam; crop suffered from bad weather and also in harvesting.
8	Do.	15	7·30	21 5 79	41	5	9 8 79	176½	24	80	7·34	26	
9	Do.	29	4·26	10 6 79	43½	10	30 8 79	340	80	81	9·30	31	
10	Do.	35 IV ..	·35	27 5 79	11	31	6 9 79	50½	144	102	10·45	37	Land is ordinary paddy land, nearly all a sandy loam; the crop suffered like those above. See crops Nos. 14, 15 and 16, Table A.
11	Do.	35 II ..	·61	27 5 79	14	23	25 8 79	42	69	90	6·45	31	
12	Do.	35 VII ..	·71	Do.	14	20	15 8 79	61	86	80	4·64	25	
13	Do.	36 I ..	1·58	Do.	15	10	24 8 79	50	32	89	6·45	31	
14	Do.	37	2·23	10 6 79	20	9	30 8 79	250	112	81	9·30	31	
15	Do.	10 I ..	1·16	6 1 80	33	28	7 4 80	130	112	92	4·80	4	Raised as a late cold-weather crop in alternate double lines with gram; the yield in some cases was very good, and considering the circumstances, the whole was fair.
16	Do.	15 I ..	2·15	6 1 80	60	28	31 3 80	504	238	85	4·80	4	
17	Do.	21	1·58	27 12 79	50	31	2 4 80	155	98	97	4·80	4	
18	Do.	33	1·77	27 12 79	45	25	25 3 80	304	172	89	10·31	11	
19	Do.	34 I ..	·38	29 12 79	18	48	7 4 80	194	511	100	4·80	4	
20	Do.	34 II ..	·72	22 12 79	35	48	7 4 80	145	201	109	8 60	6	
								Bundles.					
21	Indigo	14	3·47	5 12 78	80	23	3 cuttings up to 14 6 79	206⅓	60	191	8·26	19	See paragraph 53 of last report. Seed sown under unfavorable conditions, and outturn very low.
22	Do.	11	1·48	15 2 79	35	23	16 6 79	78½	53	121	7·17	12	Crops sown late, and, although irrigated occasionally, the yield is very low.
23	Do.	13	1·36	14 1 79	80	58	13 6 79	71	52	150	8·17	20	
24	Do.	20	1·48	19 2 79	9	6	27 6 79	48	32	128	7·57	16	
25	Do.	35 III ..	·57	22 2 79	6	10	18 6 79	26½	46	116	7·17	12	Raised in a paddy field of very inferior character and unfavorably situated; occasionally irrigated.
								Seed.					
								LB.	LB.				
26	Do.	22	·27	24 2 79	4	15	30 9 79	31	115	218	17·69	47	Raised under similar conditions to crops Nos. 22—24.
27	Do.	34 I ..	·77	1 2 79	12	15	20 9 79	60	78	232	17·69	47	The plants in this case were very fine, weighing, when cut, at the rate of 7,272 lb. per acre, but the pods were badly filled.
28	Do.	10 II ..	1·93	23 8 79	10	6	18 1 80	738	382	148	41·93	35	A magnificent crop, grown on a fair soil, in good condition.
								Dry left.					
								LB.	LB.				
29	Tobacco	8	·50	19 12 78	Planted.		3 3 79	828	1,656	74	1·05	6	See paragraphs 79—82 of last report.
30	Do.	4	·50	4 12 79	Do.		26 3 80	* 500	1,000	113	10·31	11	Raised without irrigation on a piece of fair soil.

* Estimated, part not yet stripped.

APPENDIX II-C.

STATEMENT showing Fodder Crops harvested during 1879-80 on the Saidápet Experimental Farm.

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing. Date of	Sowing. Seed Sown. Total.	Sowing. Seed Sown. Per Acre.	Details of Harvesting. Date of	Details of Harvesting. Outturn of Fodder. Total.	Details of Harvesting. Outturn of Fodder. Per Acre.	Duration of Growth.	Rainfall. Inches.	Rainfall. Wet Days.	Remarks.
			ACRES.	D. M. Y.	LB.	LB.	D. M. Y.	LB.	LB.	DAYS.			
	Irrigated Cereal.												
1	Yellow cholum	4 III ..	2·35	28 3 79	88	34	26 7 79	16,246	6,900	120	6·52	21	Soil of plot irregular; outturn, considering the season and soil, fair.
2	Do.	35 I & IX ..	·51	24 3 79	8	15	18 6 79	2,668	5,241	86	5·12	9	A paddy field, in tolerably good condition.
3	Do.	36 II & III ..	1·37	22 3 79	30	22	15 9 79	15,240	11,124	177	16·14	44	A paddy field, produced crops Nos. 16 and 33 in Table A. Crop very fine under circumstances.
4	Sorghum	23 II ..	1·5	22 3 79	50	33	19 6 79	12,468	8,312	89	5·62	10	Soil, sandy loam, in good condition. First successful crop of sort grown in the hot weather.
	Unirrigated Cereal.												
5	Maize	16 ..	2·41	11 10 79	52½	21	29 11 79	3,569	1,481	49	21·23	22	Crop sown for grain, but failed and cut as fodder.
6	Cumbu	17 ..	4·90	28 10 79	42½	8	16 12 79	1,456	297	49	16·54	16	Soil generally the poorest and worst on the farm. Crop removed and land resown with a very successful crop, not harvested.
7	Do.	33 ..	3·54	24 5 79	78	22	26 7 79	13,580	3,815	62	2·53	18	Followed No. 19. Outturn fair considering circumstances.
8	White cholum	31 ..	1·80	9 10 79	50	28	22 11 79	2,412	1,340	44	20·69	22	
9	Do.	34 II ..	1·58	28 10 79	33	21	22 12 79	1,456	921	55	16·93	19	
10	Yellow cholum	33 ..	3·54	17 10 79	87	24	26 12 79	4,928	1,392	70	22·36	28	Followed No. 7. Sown as grain crop, but failed and cut as fodder.
11	Sorghum	35 VI ..	·71	29 11 79	20	28	9 2 80	4,720	6,648	72	8·51	10	
12	Do.	4 ..	·94	13 12 79	33	35	6 4 80	4,316	4,591	115	9·05	9	
	Unirrigated Leguminous.												
13	Horse-gram	17 ..	4·90	22 3 79	82	16	11 10 79	58,510	11,953	143	24·85	48	Same field as No. 6, harvested partially dry. Outturn very good.
14	Do.	29 I ..	4·26	6 1 79	98	23	6 6 79	13,460	3,154	151	6·89	12	Soil fair quality, but in a low condition; difficult of access and remote from buildings.
15	Do.	37 II ..	·45	11 2 79	10	22	6 6 79	1,284	2,853	112	6·22	9	Grown on a paddy field—See crop Nos. 24—30 in Table A. Very satisfactory.
16	Do.	37 III, IV, & V	1·78	21 1 79	53	29	13 6 79	13,104	7,362	143	7·84	15	
17	Do.	32 ..	4·76	27 5 79	82	27	9 8 79	9,876	2,074	74	3·39	24	Preceded crop No. 10, Statement A.
18	Do.	18 ..	2·30	22 5 79	40	17	9 8 79	11,420	4,965	79	3·44	25	
19	Do.	33 ..	3·54	16 1 79	100	28	10 5 79	11,320	3,198	114	2·37	5	
20	Horse-gram and cumbu ..	21 ..	6·07	20 8 79	100	16	30 11 79	23,090	3,804	102	36·49	40	Soil very poor, but much improved by ploughing in previous crop.
21	Do. do. ..	14 ..	3·47	10 1 80	75	21	5 4 80	7,168	2,065	86	4·80	4	Followed crop No. 8, Statement A. Outturn recorded is weight of hay.
22	Dew-gram	21 ..	1·58	27 12 79	50½	32	6 4 80	26,470	16,753	101	4·80	4	Followed No. 20. Sown with crop No. 17, Statement B; return very good.
23	Do.	10 ..	1·09	6 1 80	60	55	17 4 80	3,544	3,251	102	4·80	4	Sown with crop No. 15, Statement B; half-dried when weighed.

APPENDIX III.

Statement showing the Number of Stock maintained during the Year 1879-80.

—	1879. April.	May.	June.	July.	August.	September.	October.	November.	December.	1880. January.	February.	March.	Average.
Cattle	37	36	36	34	35	35	34	39	39	42	42	43	38
Sheep	268	261	259	249	252	250	246	235	231	245	254	262	251
Pigs	14	11	4	4	4	4	4	4	4	4	7	7	6
Equivalent as country cattle 300 lb. live weight	130	129	126	120	122	122	119	127	126	129	126	131	125

Valuation of Artificial Food supplied to Stock during the year 1879-80.

—	Working Cattle.		Cows and their Calves.		Sheep.		Pigs.		Amount supplied.	Value.
	Amount.	Value.	Amount.	Value.	Amount.	Value.	Amount.	Value.		
	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.
Ground-nut Cake	36,415	639 14 9	2,196	37 14 2	44,563	769 0 0	5,596	62 7 11	86,770	1,509 4 10
Bran	..	..	1,814	36 4 5	1,083	21 10 7	24	0 7 6	2,921	58 6 6
Tour	..	..	1,333	9 8 4	350	2 8 0	114	0 13 0	1,797	12 13 4
Salt	363	13 0 9	90¾	3 4 4	544½	19 9 1	90¾	3 4 4	1,089	39 2 6
Grains	1,639	33 13 11	278	7 8 11	1,615	42 1 0	81	1 6 5	3,613	84 14 3
Total ..	..	686 13 5	..	94 8 2	..	854 12 8	..	68 7 2	..	1,704 9 5
Deduct one-third charged to manure	..	228 15 2	..	* ..	..	284 14 11	..	22 13 1	..	568 3 2
Net charge ..	..	457 14 3	..	94 8 2	..	569 13 9	..	45 10 1	..	1,136 6 3
Cost per head per mensem	..	1 4 6	..	2 10 0	..	0 3 0	..	0 10 2	..	† 0 12 1

* No deduction made, as cows were giving milk.

† Calculated on total stock, reduced to country cattle of 300 lb. live weight.

APPENDIX IV.

STATEMENT of the Accounts of the Saidápet Experimental Farm for the Year 1879-80.

BALANCE SHEET, 31ST MARCH 1880.

Liabilities—	RS.	A.	P.	*Assets—*	RS.	A.	P.
Capital	24,433	7	7	Valuation as per statement.	24,461	12	3
Due sundry persons ...	369	6	4	Due by sundry persons ...	341	1	8
	24,802	13	11		24,802	13	11

CASH ACCOUNT FOR THE YEAR 1879-80.

Receipts—	RS.	A.	P.	*Expenditure—*	RS.	A.	P.
Capital advanced by Government	6,859	7	9	Live-stock	2,177	0	7
Live-stock	800	0	11	Grains	412	4	6
Grains	578	9	6	Manures	523	10	2
Implements	278	1	3	Implements	1,095	1	2
Fruits	715	12	10	Sundries	367	13	7
Sundries	603	2	0	Labor	3,421	10	2
				Establishment	1,582	9	11
				Despatching seeds... ...	255	0	2
	9,835	2	3		9,835	2	3

PROFIT AND LOSS ACCOUNT.

	RS.	A.	P.		RS.	A.	P.
Establishment	1,580	9	11	Crops	2,277	7	2
Bad debt	4	8	0	Sundries	252	1	9
Despatching seeds	255	0	2	Capital * for balance	2,318	9	5
Implements and machines ...	807	15	9				
Labor	552	2	11				
Live-stock	1,647	13	7				
	4,848	2	4		4,848	2	4

Valuation of the Saidápet Farm and Estate made on the 31st March 1880, compared with that made on the 31st March 1879.

—	Valuation of Stock on the 31st March 1879.			Increase in the Year.			Decrease in the Year.			Valuation of Stock on the 31st March 1880.		
	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
Farm.												
Live-stock, viz.—												
Cattle	1,660	0	0	200	0	0	..			1,860	0	0
Sheep †	1,180	0	0	..			347	0	0	833	0	0
Pigs	140	0	0	25	0	0	..			165	0	0
Poultry	135	0	0	27	8	0	..			162	8	0
Cattle-food, &c. ‡	} 1,036	0	0	..			194	9	0	{ 197	8	0
Grains, &c.										643	15	0
Manures	225	0	0	5	0	0	..			230	0	0
Implement §	6,238	0	0	..			369	2	9	5,868	13	3
Crops, viz.—												
Ordinary crops	780	0	0	607	0	0	..			1,387	0	0
Fruit and fuel trees	9,000	0	0	4,114	0	0	..			13,114	0	0
	20,394	0	0	4,067	12	3	..			24,461	12	3
Estate.												
Land ‖	37,800	0	0	..			1,300	0	0	36,500	0	0
Buildings	21,900	0	0	100	0	0	..			22,000	0	0
Wells and Channels	7,000	0	0	200	0	0	..			7,200	0	0
	66,700	0	0	..			1,000	0	0	65,700	0	0

* This is the sum which the Farm cost to Government during the year.
† Decrease due to the distribution of 39 rams gratis and losses by disease.
‡ Included with grains last year.
§ Decrease due to sales and deterioration of old machines.
‖ Decrease due to diminished area of estate.

APPENDIX V.

STATEMENT of Accounts of the Implement Workshops for the Year ending 31st of March 1880.

Income.	RS. A. P.	Expenditure.	RS. A. P.
Machines	273 8 7	Carpenter, Smith, and Filer	371 0 3
Materials	421 7 10	Cooly labor	110 2 8
Labor	541 4 11	Machines, &c.	457 6 3
		Capital repaid during the year	297 12 2
Total ..	1,236 5 4	Total ..	1,236 5 4

Balance Sheet on the 31st March 1880.

Liabilities.	RS. A. P.	RS. A. P.	*Assets.*	RS. A. P.	RS. A. P.
			Valuation—		
Capital invested on 1st April 1879	1,851 11 10		Buildings	431 0 0	
Capital repaid during the year ending 31st March 1880 ..	297 12 2		Plant	193 9 0	
			Implements on sale ..	287 8 0	
					912 1 0
		1,553 15 8	Outstanding bills	..	180 10 0
			Deficiency, *i.e.*, loss since starting	..	461 4 8
	Total ..	1,553 15 8		Total ..	1,553 15 8

APPENDIX VI.

STATEMENT of the Accounts of the Madras Agricultural Department for the Year 1879-80.

Expenditure—	RS. A. P.	RS. A. P.
I. General Supervision—		
Establishment	*13,727 9 5	
Travelling Charges	559 5 5	
Exhibition of improved ploughs	420 9 10	
Ploughing competition	210 1 6	
Contingencies	419 15 11	
Surgeon for Medical charge	240 0 0	
		15,577 10 1
II. Saidápet Experimental Farm as detailed in Appendix IV	..	9,835 2 3
III. Implement Workshops as per statement given in Appendix V	..	938 9 2
IV. Educational (School of Agriculture)—		
Establishment	4,030 2 4	
Stipends and Scholarships	4,927 8 0	
Lecture Fees	5,840 0 0	
Contingent Charges	1,697 15 10	
Botanical Garden	765 6 3	17,261 0 5
Constructing School of Agriculture	10,200 0 0	
Constructing Veterinary Hospital	1,337 0 0	
		11,537 0 0
V. Estate Charges and Improvements—		
Repairs to buildings	996 12 1	
Trees and planting	318 11 1	
Manufacture of drain pipes and subsoil drainage ..	91 3 9	
Brick and mortar bridges under main roads	544 0 4	
Extension to water channels	391 8 6	
Repairs to roads	369 10 1	
Sundry works and alterations	323 1 7	
Stack staddle and sheep hurdles	452 15 5	
Maintenance to Superintendent's quarters	10 14 4	
		3,498 13 2
VI. Other Charges—		
Compensation for killing diseased cattle in the Nílgiri District	..	456 2 10
		59,104 5 11

* Does not include any furlough allowances paid to Mr. Robertson, as they have not yet been adjusted.

	RS.	A.	P.	RS.	A.	P.
Adjusted balance at the beginning of the year	2,29,786	0	2			
Income—						
Provincial Grant	20,000	0	0			
Receipts from the Surplus Pound Fund during the year 1879-80	44,218	15	7			
Saidápet Experimental Farm as per statement given in Appendix	2,975	10	6			
Implement Workshops	1,236	5	4			
				2,98,216	15	7
Balance in favor of the department on the 1st of April 1880. ..				2,39,112	9	8

Resolution—

With the foregoing letter the Superintendent of Government Farms submits his report for the year 1879-80, which will be forwarded to Government. The Board observe that the reports is unnecessarily diffuse and contains a considerable quantity of matter which would have been better omitted.

2. The season was on the whole a good one, the rainfall (about fifty-seven inches) being considerably in excess of the average at Madras. The fall was distributed over ten months of the year. The experiment in subsoil drainage was not altogether successful, and a renewed effort is to be made on another plot of land. In certain parts of the Farm crops were sown in rotation, but, owing to unexpected changes of weather, the results were of no great value. Good crops were obtained of Black Cholum (*Sorghum saccharatum* and of Planter's Friend (*Sorghum Kaffrarium*). The seed of the former crop was obtained from Trichinopoly, and Mr. Benson is doubtful regarding its sugar-producing qualities. Carolina rice failed as usual, but Madagascar paddy gave better results than formerly. Further information is promised regarding certain experiments in the cultivation of tobacco and of Manilla hemp (*Musa textilis*). The results of the experiments regarding cattle manure, referred to in paragraph 74, will doubtless prove instructive.

3. Under the heading *Live-stock* an account is given of an outbreak of disease amongst the sheep of the Farm which was productive of great loss; otherwise the report regarding the live-stock is satisfactory.

4. Speaking of accounts, Mr. Benson deprecates attempts being made at absolute accuracy in apportioning charges and says that the utility of accounts systematically drawn up would be small compared with the labor involved in their preparation. He trusts that Appendix IV will afford sufficient information. It contains two statements —one the account of receipts and expenditure, &c., and one of valuation of the property at the close of the year. The total expenditure of the year under the several heads—I, General Supervision; II, Experimental Farm; III, Workshop; IV, School of Agriculture; V and VI, Estate and Other Charges—amounted to Rs. 59,104-5-11, but the sum is exclusive of Mr. Robertson's furlough allowance, which has yet to be adjusted.

5. Referring to paragraphs 13, 14, and 96, the Board would still insist upon the maintenance of a Model Farm as distinguished from the experimental Farm. The financial results which can be obtained constitute a crucial test of the value of improved methods of agriculture, and satisfactory results ought to be constantly kept in view.

(A true Copy and Extract.)

(Signed) E. GIBSON,
Acting Sub-Secretary.

Order thereon, ——— 18th May 1881, No. 785, Revenue.

* * * *

4. The Government will note briefly such points as still call for remark. A summary of the paper has already been given in the Presidency Administration Report for 1879-80.

5. As agricultural education is dealt with separately, this subject might have been noticed more briefly.

6. One agricultural tour only was made during the year by any officer of the department. The attention of the Board has already been drawn to the advisability of such tours being undertaken as frequently as possible.

7. In the Saidápet Farm the year was more favorable to the growth of fodder than grain crops, though with the early-sown crops the yield of grain was heavier than that obtained in previous years.

8. The result of further experiments in the cultivation of Black Cholum (*Sorghum saccharatum*) will be awaited to determine its resemblance to the Chinese sugar-cane as to sugar-producing qualities.

9. Experiments in cotton cultivation are watched with interest, and it is observed that the outturn of New Orleans was satisfactory.

10. Under the head of Implements considerable attention was paid to the comparative efficiency of the different ploughs in use in Europe and America when applied under various conditions to native soils. The Swedish plough still stands high in favor in localities where the soil is dry and deep ploughing is required.

11. In paragraph 98 of the report the Acting Superintendent alludes to the necessity of engaging the services of an Agricultural Chemist. Mr. Robertson, who has now returned from leave, will no doubt submit a more detailed recommendation on the subject on the educational side.

12. The application for sanction for maintaining a Smithy establishment mentioned in paragraph 100 is also out of place in an annual report and should be separately brought forward. The objection as to supplying ploughs, &c., has been withdrawn.

* G.O., dated 14th January 1881, No. 111.

13. While concurring with the Board in the views expressed in paragraph 5 of their Proceedings, the Government are of opinion that no very reliable deductions can be expected unless comparisons are made with results obtained under other conditions of soil, climate, rainfall, &c., in dissimilar districts, which the extension of Model Farms will alone admit of.

14. The report bears evidence to the zeal evinced by the officers of the department during the year, and satisfactory results were, on the whole, obtained.

15. Paragraphs 4 to 14 of this Order will be published with the revised report and the Board's review for general information.

(True Extract.)

(Signed) E. N. OVERBURY,
Acting Under Secy. to Govt.

To the Board of Revenue.
„ the Educational Department.

Resolution—

COMMUNICATED to all Officers in correspondence with the Board.

2. The reports from the Superintendent of Government Farms which come through the Board will in future be submitted by the Board as Board's Proceedings.

It is requested that the necessary correction may be made in G.O., dated 30th April 1879, No. 663, Public, Appendix B, Column 6.

(A true Copy and Extract.)

(Signed) C. D. MACLEANE,
Acting Sub-Secretary.

To all Officers in correspondence with the Board.
" the Secretary to Government, Revenue Department.
" the Chief Secretary to Government, Public Department.
" the Superintendent of Government Farms.

Exd. C. Howarth, W. J. Lewis, and A. Grubert.